March 18, 2013

Internal Revenue Service
Exempt Organizations
P.O. Box 12192
Covington, KY 41012-0192
ATTN: Mr. Tyrone Thomas

RE: Form 1023 of Bristol Baseball, Inc.
EIN 54-0849290
TEDS Case No. EO-2012153-000433

Dear Mr. Thomas:

Thank you for discussing this matter on the phone with me on March 8. We very much appreciate your assistance.

Attached is a copy of your letter of March 7, which I have signed as to the Penalty of Perjury Statement.

Our responses to each numbered inquiry follow, along with copies of our current facility lease, management agreement and a sampling of literature concerning our organization.

1. Signed Penalty of Perjury Statement completed by Lucas Hobbs, Vice President of Bristol Baseball, Inc.
2. See attached copies of some of our marketing materials and press releases concerning our charitable activities, including partnerships with other local charities.
3. See attached facility lease with the City of Bristol, Virginia and our management agreement. Exhibits to the facility lease provide valuable information to the City of Bristol about proper maintenance of the baseball field and other City facilities to keep them in proper use for area children and youth. In addition, we have secured and provided the City with free grounds keeping seminars and instructional materials to further ensure that area children and youth are provided with safe recreational facilities.
4. Perry Hustad has served as the official scorer for the Bristol Sox games for many years. Baseball rules require an official scorer for each game, and he is paid on a per game basis, at the rate of $25, and thus $850 per season (34 games, working 4-5 hours per night, or an average of about 15 hours per week during the baseball season). This rate of pay was determined by the other Board members, without input from Mr. Hustad, after consultation with other area teams to determine the average market rate for such service. This rate of pay is the average market rate.
   Caleb Johnston, Josh Buckles, David Prichard and Zach Winkle all worked as part of the field crew, maintaining the field for play and preparing it for practice and games. Their rate of compensation was determined by the Board, without input from the family members of Mr. Johnston and Mr. Buckles, and was initially set at an hourly rate equivalent to the federal minimum wage, to compensate them at the average rate

earned by young people in the area. They received a per hour increase of 25 cents midway through last season because of their excellent work performance. During the baseball season, Mr. Winkle and Mr. Prichard worked approximately 60 hours each week, and Mr. Johnston and Mr. Buckles approximately 45 hours per week, more than in the past, due to the Board's efforts to improve the quality of the field. Last year, Mr. Buckles was paid $4,404.63, Mr. Prichard was paid $5,439.13, Mr. Johnston was paid $4,026.37, and Mr. Winkle was paid $5,131.76.

Bentley Hudgins no longer serves as clubhouse manager as indicated in our initial application. He was replaced early in the year by Jason Sowers, who worked part of last season, and the position of clubhouse manager will be filled by Ed Devine this season. The clubhouse manager is responsible for preparing the home and visitor clubhouses, as well as the umpire's room, before each game, and does game-day laundry for the home team, inventories game days supplies and prepares or coordinates a game day meal. The clubhouse manager works an average of 8 hours each day (56 hours) during the baseball season. The annual stipend of $1,078 for this position is established by the major league team with whom the Board is affiliated, and the Board is not involved in the basis for that determination. Because Mr. Sowers only worked part of the season, he was paid $658.00. Mr. Hudgins was paid $210 for the time he worked.

Taylor Dierks and Emily Strouth both serve as bat and ball girls during the baseball season, taking care of on-field needs during the games, and are paid the equivalent of the federal minimum wage for working about 4 hours per game, or an average of 16 hours per week during the baseball season. That rate of compensation is set by the Board, to compensate them at the average rate earned by young people in the area. Ms. Strouth worked all of the games last season, earning $769.06, while Ms. Dierks worked approximately one-half of them, and was paid $351.05. During some of Ms. Dierks' absences, Myan Compson was paid $148.63 to assist Ms. Dierks with the bat and ball girl duties.

Michael Luttrell was paid $515 to transport players to and from the regional airport which serves Bristol, when they arrive and depart Bristol during the season, and also to transport them to other local farm clubs when they are promoted during the season. His fee of $35 for round trip transportation to the airport and $100 for round trip transportation to Kannapolis, NC were approved by the Board, without the participation of, or input from, any of his family who serve on the Board. The fee was established at that rate to compensate him for his mileage on his vehicle, which he uses for the transportation. His hours per week depend on the need for transportation, but over the course of the season, average about 2-3 hours a week.

Jordan Childress and Jerry Skeens are college students interested in careers involving sports who served as interns for the 2012 season. They both sold advertising to games, and assisted with our marketing efforts, in addition to providing game day services, including public address announcements, radio broadcasting of road games and fan hospitality services. They were each paid a stipend of $1010 for the season, and each worked approximately 35 hours per week for the summer. The rate of that stipend was established by the Board to compensate the interns for summer living expenses away from college, and to remain competitive with other internship opportunities.

Mike Hofius is a local teacher who is paid $1000 for the season to teach English to the younger players of the team, frequently 18 or younger, who hail from foreign countries. His rate of compensation was established by the major league team with whom the Board is affiliated, at a rate deemed appropriate by them for a foreign language tutor, and he works 20 hours during the season, spending 5 hours a week during the first 4 weeks of the season.

5. Approximately 35 players are on the minor league team at any one time, and as many as five to ten of them may be 18 or younger. The facility which we help to maintain is used by high school and college teams as well. More than 240 high school players, all of whom are 18 or younger, use the facility for competitions each year. Approximately 500 college players, approximately one-quarter of whom are 18 or younger, compete on the field each season. In addition, we sponsor youth clinics for area children. Currently, we have a weekend clinic planned for early May for area children ages 7-14. This clinic will be offered free of charge. At present, we do not know the number of children who will participate, but we will target all area elementary and middle schools, as well as after-school programs, including those who target children from lower socio-economic backgrounds. We hope to reach a base of more than 2,000 children, and hope that a good percentage of them will join our clinic. We are also considering conducting a clinic later in the summer, with the assistance of some of the coaches and players from the minor league team. We also have a popular mascot, Dingbat, who makes appearances at local community events, including parades, Fourth of July celebrations and a Father's Day Event hosted by the Bristol Redevelopment and Housing Authority, to encourage local children to participate in sports. In this vein, and others, we are similar to the Johnson City Sports Foundation, Inc. (EIN 75-3122301), which has been recognized as a 501(c)(3) charity since 2004, is located about 30 miles away from Bristol, and which also supports youth sports and sports education programs with revenue gained from its facility and game-day operation of a minor league baseball team.
6. In addition to the clinics discussed above, which teach children ages 18 and younger valuable athletic skills, as well as the importance of teamwork and other worthwhile traits, and appearances of the team mascot, *see Hutchinson Baseball Enterprises v. Commissioner*, 696 F.2d 757, 761 (10th Cir. 1982) (promotion of sports among young people is educational, as their bodies must be improved just as their minds), we also will be encouraging education through our work with the local City library's summer children and youth reading programs, which reach approximately 425 children ages 18 or younger. We will lead a book drive and donate books to the library for use by those children and youth, and participate in the summer reading program by having minor league players speak to the children and youth, and by awarding free tickets to games to children and youth under the age of 18 who participate in those reading programs and additional free tickets to those who read a certain number of books in the summer. Finally, Mr. Hofius' teaching of English to primarily Spanish-speaking young people is also an educational service the Board provides.
7. Our expense schedules for lines 15 and 23 on page 9 of Form 1023 were attached as part of our initial application. *See* pages 44-46 of application. You advised that you sought details on line 8 from page 10 (rather than 14) as well. That detail also was included as part of our initial application. *See* pages 56-58 of application. Most of

those depreciable items relate to the ballfield, which as noted above, is used by local high school and college teams, as well as for educational clinics for our local youth, including those from lower socio-economic groups.

8. We have received no grants from governmental agencies.
9. None of our Board members operate a business which does business with us. Three of the Board members (Mr. Hustad, Mr. Buckles and Mr. Johnston, discussed above under question No. 4; Mr. Bentley Hudgins no longer serves as clubhouse manager) are independent contractors and as such derive minimal revenue from their work with the Board, as described in Part V of our initial application. *See* pages 36-41 of application. Those members and their family members, if any, are not involved in determining the rate of compensation or other terms and conditions of work, to ensure that the terms are negotiated at arms' length and that these arrangements do not result in any more than fair market value compensation.
10. A copy of our current lease/rental contract is attached, per item 3 above.
11. Our scholarship program is designed to ensure an unbiased selection process by delegating the authority for designing and publicizing the application materials, as well as the authority to review applications, interview applicants and award scholarships, to our local high schools. Our Board believes this is the best way to ensure an unbiased selection process, free from taint of the Board being accused within the community of "playing favorites." The Board believes that our local high schools take appropriate steps to ensure that neither members of any selection committee nor their relatives are eligible to apply for scholarships.
12. When awarded, generally one scholarship is awarded each year.
13. We estimate that approximately 20-25 individuals are eligible to apply for a scholarship each year.
14. Scholarship funds are paid directly to the scholarship beneficiaries, who promise to the Board to apply those funds toward their college education, although written verification of that has not been acquired in previous years. It is the Board's intent to require a written statement to that effect in the future and/or to pay the scholarship directly to the college or university of the beneficiaries' choosing.
15. Generally, when awarded, $1,000 is allocated for scholarships each year.
16. If a misuse of scholarship funds is discovered, the recipient is requested to repay those funds to the Board so they the funds may be awarded to another recipient. In addition, if the high school is involved in the misuse of funds, the school will be removed from the Board's rotation of local high schools whose students benefit from the Board's scholarship program.
17. Generally, when awarded, each scholarship is in the amount of $1,000.
18. We defer to each local high school to publicize the scholarship program to their high school students and do not maintain copies of any written materials.
19. We defer to each local high school to produce their own application forms, and do not maintain copies of any forms. We do request that the schools consider financial need in making scholarship selections.
20. We defer to each local high school to assemble their own selection committee.
21. The Board trusts the scholarship recipients to apply the scholarship funds toward the selected high school student's course of study at a college or university. If the Board learns that scholarship funds are not used for that purpose, the Board requests that the

recipient repay those funds. In addition, if the high school is involved in the misuse of funds, the school will be removed from the Board's rotation of local high schools whose students benefit from the Board's scholarship program.

Should you have any additional questions, please let me know.

Sincerely,

Lucas Hobbs
Vice President
Bristol Baseball, Inc.

Internal Revenue Service
TEGE:RA:EOG-7887
P. O. BOX 2508
Cincinnati, OH 45201

Department of the Treasury

Date: March 7, 2013

BRISTOL BASEBALL INCORPORATED
P.O. BOX 1434
Bristol, VI. 24203

Employer Identification Number:
54-0849290
Person to Contact - EO Group #7887
Tyrone Thomas
ID# 1000281724
Contact Telephone Numbers:
626-312-3610 Phone x-5037
859-669-3783 Fax
Response Due Date:
March 28, 2013

Dear Sir or Madam:

We need more information before we can complete our consideration of your application for exemption. Please provide the information requested on the enclosure by the response due date shown above. Your response must be ***signed*** by an authorized person or an officer whose name is listed on your application. Also, the information you submit should be accompanied by the following declaration:

> ***Under penalties of perjury, I declare that I have examined this information, including accompanying documents, and, to the best of my knowledge and belief, the information contains all the relevant facts relating to the request for the information, and such facts are true, correct, and complete.***

If we approve your application for exemption, we will be required by law to make the application and the information that you submit in response to this letter available for public inspection. Please ensure that your response doesn't include unnecessary personal identifying information, such as bank account numbers or Social Security numbers that could result in identity theft or other adverse consequences if publicly disclosed. If you have any questions about the public inspection of your application or other documents, please call the person whose name and telephone number are shown above.

To facilitate processing of your application, please attach a copy of this letter and the enclosed Application Identification Sheet to your response and all correspondence related to your application. This will enable us to quickly and accurately associate the additional documents with your case file. Also, please note the following important response submission information:

- Please don't fax and mail your response. Faxing and mailing your response will result in unnecessary delays in processing your application. Each piece of correspondence submitted (whether fax or mail) must be processed, assigned, and reviewed by an EO Determinations Specialist.

- Please don't fax your response multiple times. Faxing your response multiple times will delay the processing of your application for the reasons noted above.

BRISTOL BASEBALL INC.

- Please don't call to verify receipt of your response without allowing for adequate processing time. It takes a minimum of three workdays to process your faxed or mailed response from the day it is received.

If we do not hear from you within that time, we will assume you no longer want us to consider your application for exemption and will close your case. As a result, the Internal Revenue Service will treat you as a taxable entity. If we receive the information after the response due date, we may ask you to send us a new application.

In addition, if you do not respond to the information request by the due date, we will conclude that you have not taken all reasonable steps to complete your application for exemption. Under Code section 7428(b)(2), you must show that you have taken all the reasonable steps to obtain your exemption letter under IRS procedures in a timely manner and exhausted your administrative remedies before you can pursue a declaratory judgment. Accordingly, if you fail to timely provide the information we need to enable us to act on your application, you may lose your rights to a declaratory judgment under Code section 7428.

If you have any questions, please contact the person whose name and telephone number are shown in the heading of this letter.

Sincerely yours,

J. Thomas

Exempt Organizations Specialist

Enclosure: Information Request
Application Identification Sheet

Additional Information Requested:

1. Please read the Penalties of Perjury statement on page 1 above. Then, please sign and date below, indicating you agree to the Declaration.

Name

3-18-13
Date

BRISTOL BASEBALL INC.

- 2. Please submit copies of any brochures, pamphlets, newsletters, advertisements, newspaper clippings, flyers or any other literature regarding your organization. You need not submit any documents previously submitted with Form 1023. If any.

- 3. Please provide copies of all, if any, written leases, contracts, or agreements entered into by your organization. You need not submit any documents previously submitted with Form 1023. If any.

- 4. Please account for salaries and other compensation paid by your organization (**actual** and/or **proposed**). **Include the name of each recipient, the duties performed by each, the number of hours each week devoted to such duties, state the amount of compensation each receives; indicate who determined the amount of compensation; indicate the basis used to determine the compensation amount.**

5. How many members are on your team and of that number how many are age 18 years and under? Please explain.

6. Do you offer any educational programs? If yes, list programs and content of program?

7. Send us an **expense schedule** for Line-15, and L-23 on page 9, also on line-8 on page 14 on your F-1023 application.

8. Send us copies of any **grants** you have received from any governmental agency in your community. If any.

9. Will any of your board members and/or officers have a business that will do business with you? If yes, please explain.

10. Send us a copy of your rental contract for your facility and who is the owner?

SCHOLARSHIP PROGRAM:

11. Are members of the selection committee or their relative eligible to apply for scholarship? If so, please describe the procedures you follow to ensure an unbiased selection.

12. Indicate the approximate number of scholarships awarded annually.

13. Gave the approximate number of individuals eligible to apply.

14. Describe the procedures you follow to monitor scholarship funds.

BRISTOL BASEBALL INC.

15. Describe the procedures you follow if you discover a misuse of scholarship funds.

16. How much money is allocated to this practice?

17. Please indicate the dollar amount(s) of your scholarships.

18. Please describe how your program will be publicized to insure that all eligible person are reasonably likely to be aware of the availability of your financial aid. Please submit copies of any written materials providing such notification.

19. Please provide a copy of your application form for scholarship assistance.

20. Who will comprise the selection committee?

21. Please describe the procedure(s) that will be implemented to insure that your funds will be used for there intended purposes. Please also identify any measures that you will take to recover the funds if you discover that a recipient has failed to use such funds for their intended purposes.

IF FAXING, PLEASE DIRECT ALL CORRESPONDENCE TO:

859-669-3783

IF MAILING, PLEASE DIRECT ALL CORRESPONDENCE TO:

US Mail:

Internal Revenue Service
Exempt Organizations
P. O. Box 12192
Covington, KY 41012-0192

Street Address:

Internal Revenue Service
Exempt Organizations
201 Rivercenter Blvd
ATTN: Extracting Stop 312
Covington, KY 41011

Box for IRS use only

☐ Additional Payment

Application Identification Sheet

TEDS Case Number: EO-2012153-000433
Employer Identification Number: 54-0849290
Opening Document Locator Number: 17053-146-34402-2
Form: 1023
Organization Name: BRISTOL BASEBALL INCORPORATED

Please include a copy of this Application Identification Sheet with any additional correspondence or documents you may submit related to your application. This Application Identification Sheet will enable us to associate the additional correspondence or documents with your application case file quickly and accurately, to facilitate processing of your application.

Please do NOT send a copy of this Application Identification Sheet with a new application. To do so would delay processing of the new application.

Please send any additional correspondence or documents related to your application, along with a copy of this Application Identification Sheet, to:

Internal Revenue Service
P.O. Box 12192
Covington, KY 41012-0192

EO-2012153-000433

Bristol Baseball, Incorporated
P.O. Box 1434
Bristol, Virginia 24203
276-206-9946 Fax 276-669-7686

Bristol White Sox announce Ks for Kids

Bristol, VA June 6, 2012

The Bristol White Sox are pleased to announce a great partnership between Lopez Wealth Management, the Boys & Girls Clubs of the Mountain Empire, and the Sox.

For every strikeout a Bristol Sox pitcher records this season, Lopez Wealth Management will donate $10 to the Boys & Girls Clubs of the Mountain Empire.

"The Boys & Girls Clubs of the Mountain Empire's mission is to inspire and enable all young people, especially those who need us most, to realize their full potential as productive, responsible and caring citizens," stated Eric Clark, executive director of the Boys & Girls Clubs of the Mountain Empire. "We are appreciative of Lopez Wealth Management's commitment to our young people, and thankful for the assistance of the Bristol Sox and Bristol Baseball, Incorporated."

The Bristol White Sox, also known as the Bristol Sox, are operated by Bristol Baseball, Incorporated, a non-profit organization operated by an all-volunteer Board which has no full-time paid staff.

"Last year, Sox pitchers recorded 546 strikeouts, and the year before, we had 514," said Mahlon Luttrell, President of Bristol Baseball, Incorporated and General Manager for the White Sox. "We are looking forward to this opportunity to help our local Boys & Girls Club enrich the lives of our young people."

Lopez Wealth Management is based in Abingdon, Virginia.

"We are excited about this opportunity to give back to our community," stated Wade Lopez, President and Founder of Lopez Wealth Management. "We encourage everyone to come out to the Bristol Sox games this season, and cheer them on."

For more information on the Bristol Sox, the schedule of home games and professional baseball in Bristol, visit BristolSox.com.

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Bristol Baseball, Incorporated
P.O. Box 1434
Bristol, Virginia 24203
276-206-9946 Fax 276-669-7686

Bristol White Sox announce Sox Community Fund

Bristol, VA June 7, 2012

The Bristol White Sox have announced the creation of the Sox Community Fund, which will benefit local charities in the Bristol area.

Volunteers will sell 50/50 raffle tickets at each Sox home game this season, with the proceeds benefitting local non-profits, including the United Way of Bristol, and several of its partner agencies including Abuse Alternatives, American Red Cross, Appalachian Independence Center, Boys & Girls Club, CASA for Kids, Children's Advocacy Center of Bristol/Washington County, Healing Hands Health Center and Sequoyah Council – Boy Scouts of America.

"The Bristol White Sox are offering a great opportunity for baseball fans to come out, have a great time at the game and give back to their community at the same time," stated Lisa Cofer, executive director of the United Way of Bristol. "On behalf of the United Way of Bristol and its partner agencies, we are excited to participate with, and benefit from, the Sox Community Fund. I can't wait for the season to start."

United Way of Bristol and its 28 agencies provide services to thousands of people in need each year in the Bristol community.

The Bristol White Sox, also known as the Bristol Sox, are operated by Bristol Baseball, Incorporated, a non-profit organization operated by an all-volunteer Board which has no full-time paid staff.

"The Bristol White Sox are extremely excited about the creation of the Sox Community Fund," said Mahlon Luttrell, President of Bristol Baseball, Incorporated and General Manager for the White Sox. "It allows us to continue our tradition of giving back to the community, and we want to encourage our fans to support the Sox Community Fund by purchasing raffle tickets at each home game this summer."

For more information on the Bristol Sox, the schedule of home games and professional baseball in Bristol, visit BristolSox.com.

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Bristol Baseball, Incorporated
P.O. Box 1434
Bristol, Virginia 24203
276-206-9946 Fax 276-669-7686

Bristol White Sox announce food drives to benefit the community

Bristol, VA June 8, 2012

The Bristol White Sox will sponsor two canned food drives this season at Boyce Cox Field. The drives will benefit local food banks, and give Sox fans a chance to win baseball bats autographed by this year's Sox team.

The first drive, to benefit the Bristol Emergency Food Pantry, will be Wednesday, June 20, when the Sox host the Bluefield Blue Jays. The second, to benefit Feeding America Southwest Virginia, will be Wednesday, August 8, when the Sox take on the visiting Kingsport Mets.

For each canned food item fans bring to either game, they will receive a ticket to be entered in a drawing on the night of each game to win a baseball bat autographed by the 2012 Bristol Sox team.

"We are excited about this chance to help out two community organizations who do so much to help local residents in need," said Mahlon Luttrell, President of Bristol Baseball, Incorporated and General Manager for the White Sox. "We encourage all our fans to bring at least one canned food item on both of these food drive nights, and have a chance to take home an autographed bat."

Fans who want to get a head start on their chances to win an autographed bat can drop off canned food items at other Sox games, by bringing the items to the Sox Box, but must be present at the food drive games in order to win.

The Bristol White Sox, also known as the Bristol Sox, are operated by Bristol Baseball, Incorporated, a non-profit organization operated by an all-volunteer Board which has no full-time paid staff.

All Sox games begin at 7 pm, with the gates scheduled to open at 6 pm.

For more information on the Bristol Sox, the schedule of home games and professional baseball in Bristol, visit BristolSox.com.

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Bristol Baseball, Incorporated
P.O. Box 1434
Bristol, Virginia 24203
276-206-9946 Fax 276-669-7686

Bristol Sox leading successful charitable campaigns

Bristol, VA July 9, 2012

The Bristol White Sox's season is under way, along with two charitable campaigns sponsored by the Sox and Bristol Baseball, Incorporated.

The Bristol White Sox, also known as the Bristol Sox, are operated by Bristol Baseball, Incorporated, a non-profit organization operated by an all-volunteer Board which has no full-time paid staff.

Nearly 10,000 patrons have passed through the gates at Boyce Cox Field thus far in 2012, and they have supported the Sox Community Fund by their purchase of raffle tickets at the ballgames. The tickets are sold by the United Way and its partner agencies.

"We are happy to announce that the Sox Community Fund has raised more than $1250 for local non-profits in the first third of the season," said Mahlon Luttrell, President of Bristol Baseball, Incorporated and General Manager for the Sox. "As we get the word out about this program, we hope to do more to benefit our community as the season rolls along."

The Ks for Kids program is funded by Lopez Wealth Management, which contributes $10 for every strikeout by a Sox pitcher to the Boys and Girls Club.

"The Ks for Kids program has raised $1660" said Luttrell. "Our pitching staff has been at or near the top of the Appalachian League strikeouts list all season long, and in addition to helping the team, they are helping the children of our community."

For more information on the Bristol Sox, the schedule of home games and professional baseball in Bristol, visit BristolSox.com.

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Bristol Baseball, Incorporated

P.O. Box 1434
Bristol, Virginia 24203
276-206-9946 Fax 276-669-7686

Bristol Sox partner with Feeding America to raise funds to feed needy

Bristol, Va. August 17, 2012

Bristol Baseball, Incorporated, operator of the Bristol White Sox, and Feeding America Southwest Virginia, are proud to announce that Sox fans contributed almost $1400 worth of food during last week's food drive during the Sox-Kingsport Mets game.

"Bristol Baseball and the Sox are committed to helping out our community," said Mahlon Luttrell, President of Bristol Baseball, Incorporated and General Manager for the Sox. "We are delighted that our loyal fans turned out with such a great response to this food drive."

Sox fans contributed 221 pounds of food, along with $107 in cash donations.

"Feeding America Southwest Virginia is able to leverage each dollar contributed to provide $9.00 worth of food to feed local needy families," said Nicole Dyer, Product Coordinator & Volunteer Recruiter for Feeding America Southwest Virginia. "Combining the cash and donated food contributed by baseball fans in Bristol, we will be able to supply 598 meals."

Feeding America Southwest Virginia was founded in 1981 and proudly commemorates 31 years of fighting hunger and changing lives through community partnerships. The Food Bank is an affiliate member of Feeding America.

For the last three decades the Food Bank's ultimate mission has remained the same: eliminate hunger in the region. The primary function of the Food Bank is to secure large quantities of food for the hungry.

More than $26 million worth of food and grocery related products are channeled through a network of more than 419 feeding programs (in a 26-county and 10-city region) that provide food or meals to those in need. Visit www.faswva.org for more information or "like" Feeding America SWVA on Facebook..

To encourage fans to support the food drive, the Sox gave away a team autographed bat to one lucky fan. Carolyn Stophel of Bristol was selected at random as the winner of the bat.

For more information on the Bristol Sox, the schedule of home games and professional baseball in Bristol, visit BristolSox.com.

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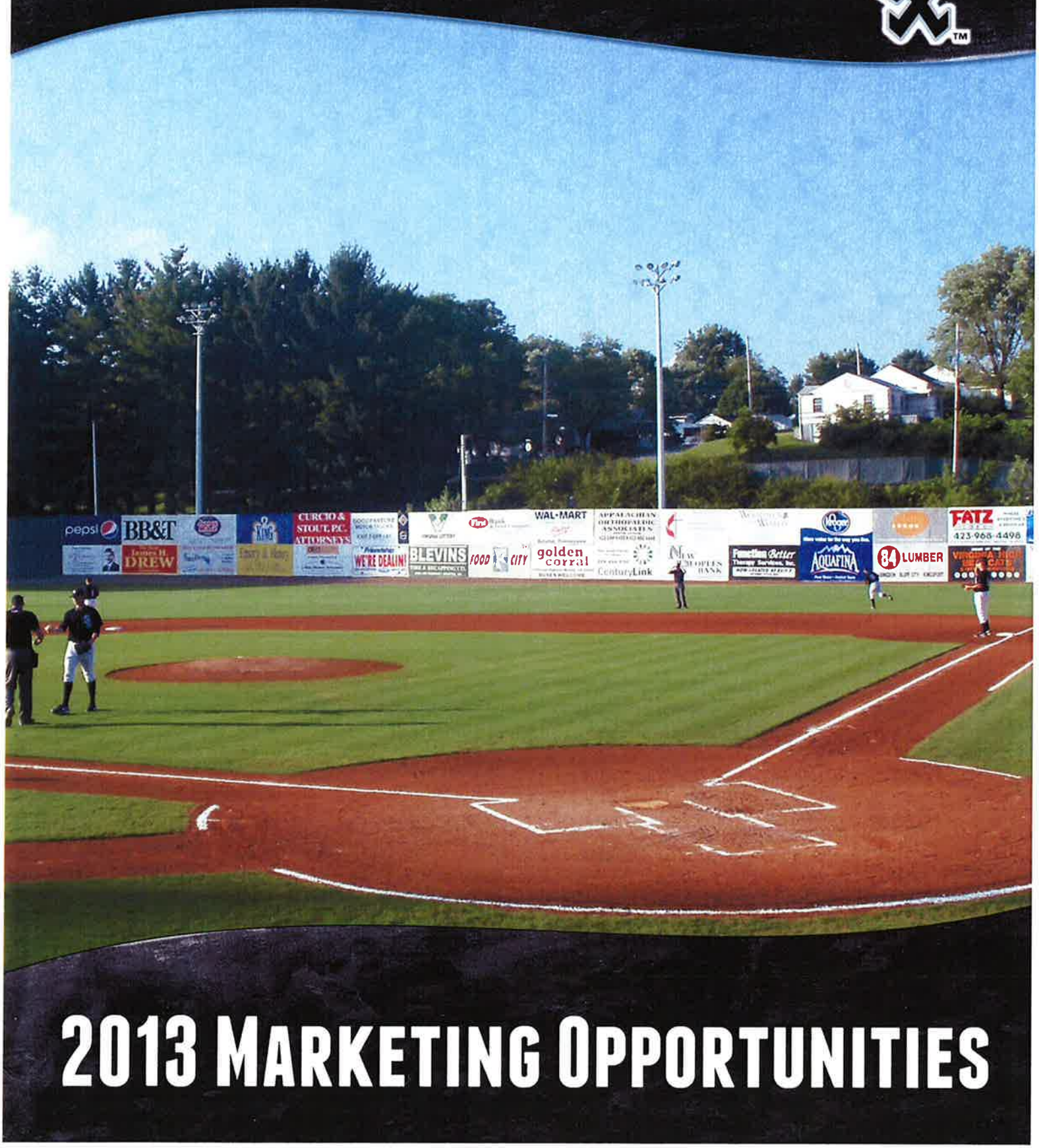
BRISTOL WHITE SOX

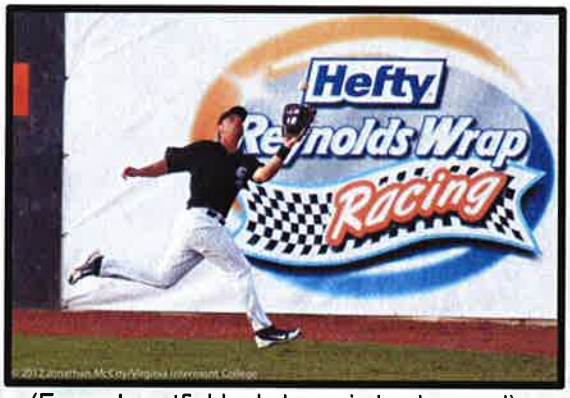


2013 MARKETING OPPORTUNITIES

Signage Opportunities

Outfield Sign

A premiere signage opportunity which allows every fan who comes through our gates to see your sign. The sign measures 8' x 16' and can be customized with any graphic. A general admission bonus ticket and a small program ad are included with purchase. Signs are also displayed throughout the Virginia Intermont and Virginia High seasons.



(Example outfield ad shown in background)

Concourse Sign

The best way to get fans to see your brand before, during, and after each Bristol White Sox home game. Located in various locations, these signs are located behind the home plate grand stands or on the fences as fans walk to their seats. Concourse signs are 3' x 5' and can be customized with any graphic.

Other Sign Locations

Dugout Tops
Foul Pole Sign
On Deck Circle
Various Other Locations

Print Opportunities

(2012 Program. 2013 design to change)

Souvenir Program

The Bristol Sox Souvenir Program is a great way to show your ad to every fan who purchases a program. Ad types are:

- Outside Front Cover (color)
- Outside Rear Cover (color)
- Full Page Inside (color or black & white)
- Half Page Inside (black & white)
- Fourth Page Inside (black & white)
- Business Card Size
- Game Day Insert (provided by client)

Pocket Schedule

Every year, the Sox distribute pocket schedules. These schedules are distributed to our fans and local businesses throughout the Tri-Cities area. They could feature your advertisement in a 2 3/8" x 3 3/8" space.

In-Game Opportunities

Fireworks Night

Want to give your company a 'booming' advertisement? Then consider sponsoring a fireworks night during the Bristol Sox season. It is always a crowd favorite!

Promotional Nights

Be the sponsor of one of our home games and create a night that fans will not forget. Sponsoring a night includes marketing on our website's promotional schedule as well as the field's marquee.

Inning Giveaways

Really want to get your name known? Then why not put your branded items into the hands of our fans as inning giveaways! Opportunities include, but are not limited to:

-bobble heads -softie balls -magnetic schedule
-souvenir cups -rally towels -noise makers
-mini-bats -kids' helmets -draw-string bags

Sponsor Something New

Be a part of something new at Boyce Cox Field that fans will never forget. Ideas include:

-Guest PA Announcer -Foul Ball Sponsor
-First Pitch Sponsor -The Strikeout Counter
-Bingo -Inning Prizes

On-Field Promotions

Take your advertising directly to the field by sponsoring one of our many on-field games that take place in between innings. Come up with new ideas or simply sponsor one of the classics like the "Dizzy Bat Race" or the "Mascot Race." Reward the contestants and possibly the fans by placing coupons or prizes in their hands!

Exit Sampling

Get your materials to fans in a unique way. Whether it be after every game or conditional (e.g. Sox win), your material could be placed right in the hands of our fans as they exit the park.

Community Opportunities

Sox Community Fund

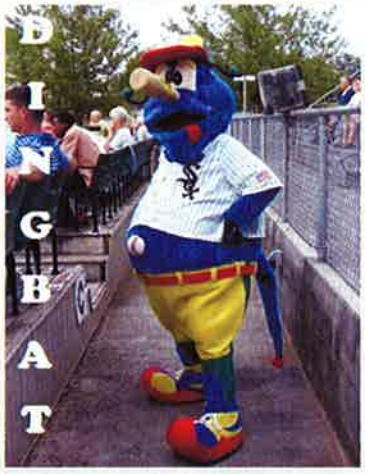
Want to be one of the local non-profit organizations that help with the Sox Community Fund? Send us an email to find out more information.

Kids' Club

The Bristol Sox love our faithful fans, especially the youngsters. Sponsor our ongoing Kids' Club for kids 12 and under. Kids are selected nightly to win a special prize from the Sox and a gift from the sponsor.

Dingbat

Dingbat is the fun and loveable mascot of the Sox. Dingbat provides entertainment to fans not only at every Sox home game, but at community events as well. Be his sponsor and place your logo on his uniform for all to see!



Bristol Sox

Media Opportunities

Official Starting Lineup

Get your company's name out by sponsoring our Starting Lineup in the park and on our Internet Radio broadcasts. Every home game, your company's name will be announced as the Official Sponsor of the Starting Lineup!

Internet Radio

Extend your name far beyond the reaches of the ballpark by advertising on our Internet Radio Broadcasts throughout the season. You can supply a recording or have our top-notch announcing team handle that for you. Your company's ad will be played or your company will be mentioned several times each game.

Website Advertising

Seen by thousands of Sox fans a year, the BristolSox.com website is a prime place for you to advertise. Each time someone visits the site, your ad will be displayed. Each spot is filled for the full year. Video spots are also available.

Facebook Advertising

Sox fans regularly check our Facebook page. When fans click to see our page, they could see your advertisement as well! Each spot is filled on a monthly basis.

Home Game PA Spots

Have your advertisement read once per game for all of the fans at Boyce Cox Field to hear!

Ticket Options

General Admission Bonus

Enjoy access to 30 Bristol Sox Home Games for one low price with the General Admission Bonus Ticket. The ticket can be used for more than one person, but each person counts as one punch on the ticket.

Group Rates

Groups of 10 or more person can receive a special ticket price of $3.00 per person. Groups of 25 or more can combine their tickets with a BBQ meal for $13.00 per person.

Reserved Seating

The Sox still have a very limited number of reserved season tickets available. Located behind home plate and on the first and third base sides, reserved seating allows fans to have the same seat all year long.

Contact Us

Bristol White Sox
Operated by Bristol Baseball, Inc.
Phone: 276-206-9946
1501 Euclid Avenue, Bristol, Va 24201 (Physical)
P.O. Box 1434, Bristol, Va 24203 (Mailing)

GM (Mahlon Luttrell): gm@bristolbaseball.com
Marketing (Lucas Hobbs): marketing@bristolbaseball.com
Season Tickets: seasontickets@bristolbaseball.com
Group Sales: groupsales@bristolbaseball.com

THIS LEASE AGREEMENT made the 25th day of February, 2013, by and between the CITY OF BRISTOL, VIRGINIA ("City"), a municipal corporation, 300 Lee St., Bristol, VA 24201, and BRISTOL BASEBALL, INC. ("BBI"), a non-profit non-stock corporation organized and existing under the laws of the Commonwealth of Virginia, P.O. Box 1434, Bristol, VA 24203:

WITNESSETH

WHEREAS the City and BBI are currently parties to an existing Lease Agreement bearing date of February 23, 2012, and wish to modify their Lease Agreement; and

WHEREAS the City owns certain real estate suitable for use as a baseball playing field, situated within the City of Bristol, Virginia, and lying between Euclid Avenue and Randolph Street, and commonly and popularly known as Boyce Cox Field (the "Field"); and

WHEREAS the Field is surrounded by grandstands, home and visitors' clubhouses, batting cages, concession stands, press boxes, gates, signage, parking areas and a pavilion (collectively, the "Ballpark"); and

WHEREAS BBI currently does, and desires to continue to, operate a professional minor league baseball franchise in the City of Bristol, Virginia; and

WHEREAS the City deems it important to afford and advance professional baseball to its citizens and visitors to the City of Bristol, Virginia.

NOW THEREFORE, in consideration of the foregoing, and of the mutual benefit to be derived by the parties hereto, it is agreed:

1. BBI shall be allowed primary use of the Ballpark during minor league baseball competitions, including both regular season and playoff games, and practices, from one week before the first regularly scheduled game of each Appalachian League season until the final playoff game of each Appalachian League season, provided however, in the event the Virginia High School baseball season is still ongoing (including playoffs) the field shall be shared and any conflicts shall be resolved at the sole discretion of the City Manager, with input from the Bristol Virginia Public Schools, BBI, the Appalachian League and Minor League Baseball. BBI shall notify the City when the annual Appalachian League season schedule is announced, so that the City is aware of same. BBI shall be allowed reasonable use of the Field at other times, and shall be allowed use of the other parts of the Ballpark with prior permission of the City Manager or his designee, which shall not be unreasonably withheld, for the purpose of carrying on activities related to the operation of a professional minor league baseball franchise.

2. BBI shall have the right to erect signs in the Ballpark. BBI agrees to pay for such signs and to maintain them, and shall be entitled to the proceeds from the sale of advertising on such signs to help pay Appalachian League fees and/or other expenses related to the operation of a minor league baseball team, including but not limited to assisting in making additional improvements to the Field and the other parts of the Ballpark.

3. BBI shall have the sole rights to operate all souvenir sales at the Ballpark, to assess parking fees at the Ballpark and to sell tickets and programs at or to the Ballpark in connection with any of the games or practices set forth above in Paragraph 1, and shall retain the proceeds therefrom to help pay Appalachian League fees and/or other expenses related to the operation of a minor league baseball team, including but not limited to assisting in making additional improvements to the Field and the other parts of the Ballpark. BBI shall be permitted to operate concessions at the Ballpark, with the understanding that the Virginia High Boosters Club will be permitted to use the concession stands located under the press box. The City shall encourage the Virginia High Boosters Club to assist financially with the upkeep and maintenance of the Ballpark. BBI shall have the sole rights to sell beer at the Ballpark, and shall be responsible for obtaining any and all Alcoholic Beverage Control permits and approvals for such, and compliance with such permits, provided however, (i) the consumption of beer shall be limited to a "beer garden" area located in the left-field/center-field bleachers and (ii) all profits from the sale of beer shall be kept separate from all other ballfield proceeds and shall be spent on facility improvements (including equipment), with such profits first split on an 80% (BBI) / 20% (City) basis until such time as the payment of the balance, with interest, of the loan BBI obtained to improve the infield of the Field, and the payment of the construction of the beer garden facility, then to be agreed upon by the City and BBI.

4. As between these two parties, BBI shall retain all broadcast rights to the games and practices set forth above in Paragraph 1.

5. BBI shall have the exclusive right to occupy clubhouse manager's office in the home clubhouse, as well as the General Manager's office and "The Dugout" in the press box. The City shall have the right to access those spaces, but shall not allow third parties to access those spaces. The City shall provide BBI sufficient space at the Ballpark to store and safeguard items belonging to BBI or such major league team as is affiliated with BBI.

6. BBI shall pay the City $1.00 per year, said amount due by July 1st of each year.

7. BBI agrees to obtain and maintain insurance in the minimum amount of $1,000,000 General Liability at all times during which games or practices set forth above in Paragraph 1 are ongoing.

8. BBI agrees to refrain from using the Ballpark when use thereof would irreparably damage the Field. Subject to the rules governing the play of baseball games, the City, by and through its Director of Recreation, may cancel a game or practice set forth above in Paragraph 1, if in his or her judgment, the use of the Field would irreparably damage it.

9. BBI shall observe all federal, state and local laws with respect to its actions herein authorized.

10. The use of tobacco products in the public seating areas will be prohibited during minor league baseball competitions, including both regular season and playoff games.

11. In recognition of the fact that the Field needs to be properly cared for and given time to heal and be repaired, so that it can remain in good shape for the playing of professional baseball in order to continue to allow the City to offer professional baseball to its citizens and visitors, the use of the Field by Virginia Intermont College for practice before January 15 shall be discouraged by the City, and the City will make all reasonable efforts to accommodate VI baseball on other City fields. However, the City shall have sole discretion over the use of its field, and will strive to prohibit any use by anyone that may, in its sole discretion, irreparably damage the Field, or would create damage which could not practically be repaired before one week before the first regularly scheduled game of each Appalachian League season. The City will clean the clubhouses at least one week before the first regularly scheduled game of each Appalachian League season to restore them to at least the condition in which they were left at the end of the previous Appalachian League season.

12. The City agrees to furnish equipment and staff to provide routine maintenance of the Field and Ballpark as prescribed in Rule 58 of the Rules of Major League Baseball and white sand for sodding and overseeding of turf, mound clay and Marbet's Infield Mix, brick track and turface, and to drag and line the Field prior to each game, in a manner so that play of each game may begin by its announced time. The City also agrees to clean the Ballpark at least six hours before each game set forth above in Paragraph 1. The City also agrees to employ a certified sports turf manager whose duties shall include, but not be limited to, supervision over the grass surface of the Field.

13. BBI and the City shall ensure that the Field meets the Standards for Minor League Playing Facilities as set forth in Rule 58 and Attachment 58 of the Rules of Major League Baseball, which Rule and Attachment are attached to this Agreement as Exhibit A, as well as any standards established by the Appalachian League. The City shall seed, fertilize, reseed, water, aerate and mow the Field in accordance with the standards set forth by the aforementioned certified turf manager. Additionally, the City will give reasonable consideration to the

recommendations of the Brickman Group, the consultant retained by BBI, whose report and recommendations are attached to this Agreement as Exhibit B.

14. The City will be responsible for all ordinary exterior and structural maintenance of the Ballpark.

15. BBI and the City shall jointly work to provide and maintain training programs for groundskeeping personnel to ensure properly prepared playing surfaces.

16. BBI and the City shall jointly work to pay for, or help in obtaining the funding to pay for, the materials and supplies involved in any capital improvements to the Ballpark, and the City will assist in providing labor and equipment for such improvements. BBI and the City shall seek grants and private funding to assist with capital improvements to the Ballpark.

17. The City will provide, or pay for, all lights, water, sewer and trash utility services at the Ballpark. The lighting must be maintained to meet the Standards for Minor League Playing Facilities as set forth in Rule 58 and Attachment 58 of the Rules of Major League Baseball, which Rule and Attachment are attached to this Agreement as Exhibit A.

18. BBI agrees to provide adequate personnel to operate a tarp and shall operate such tarp to cover the Field during a game or practice set forth above in Paragraph 1, or during the time beginning one hour before a scheduled game. The City shall provide adequate personnel to operate a tarp and shall operate such tarp during all other times.

19. This Agreement constitutes the only agreement of the parties and cannot be changed or supplemented except by a writing signed by both parties. The signers of this document warrant that they have the authority to execute this Agreement on behalf of the party for whom they sign. This Agreement shall be interpreted under the laws of the Commonwealth of Virginia, and the parties hereto recognize that both of them have contributed to this Agreement and that it should not be construed against either of them as drafter of the Agreement.

20. This Lease Agreement shall be valid for a two-year term beginning on the date printed above. Subject to paragraph 18 below, at the expiration of that two-year term or of any renewal term, the Lease Agreement shall renew for successive two-year terms unless one party gives the other party written notice, at the addresses set forth above, of its intent to terminate and renegotiate the Lease Agreement by the January 1 preceding the expiration of the then-current term.

21. Should BBI lose its affiliation with a Major League Baseball team, this Lease Agreement may be terminated by BBI upon its giving 15 days written notice to the City at the City's address set forth above.

CITY OF BRISTOL, VIRGINIA
By Dewey P. Cashwell
City Manager

BRISTOL BASEBALL, INC.
By Mahlon Luttrell, its President and General Manager

(B) is the latest departing flight scheduled to arrive at least five hours before the start of the game.

(6) Itineraries. Subject to the specific rules set forth above, a Minor League Club with a PDC must request the Major League Club's approval of all itineraries (i.e., scheduled route, type of plane if size and quality of equipment is a concern, and departure and arrival times) for bus, hotel and air travel. Such itineraries must be submitted to the Major League Club for approval at least 15 days before the trip to which it applies.

(b) HOTEL. The Major League Club must approve all hotels used by a Minor League Club that is party to a PDC, which approval shall not unreasonably be withheld in the case of hotels recommended by the Minor League Club. If a Major League Club approves a hotel(s) for use at the home site of a Minor League Club with which it has a PDC, that approval shall be sufficient for all visiting Minor League Clubs.

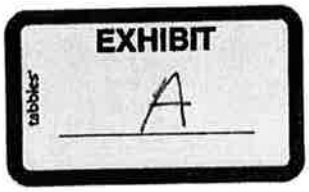
Rule 58

STANDARDS FOR MINOR LEAGUE PLAYING FACILITIES

(a) STANDARDS. Each Minor League Club must maintain a playing facility that complies with agreed standards. These standards are set forth in Attachment 58. Any variance or waiver may be granted only by both the President of the Minor League Association and the Commissioner or the Commissioner's designee and shall remain in effect only for the time remaining in the current PDC, unless both the President of the Minor League Association and the Commissioner or the Commissioner's designee agree that the variance or waiver involves a structural issue (a category that includes, but is not limited to, the construction of walls and other permanent features of a facility) for which a variance or waiver of longer duration is appropriate. Any variance or waiver granted under this Rule 58(a) may be renewed beyond its expiration for the term of a successor PDC.

(b) MONITORING OF COMPLIANCE. The Commissioner's Office shall employ or otherwise contract for inspectors who will monitor Minor League Clubs' compliance with the agreed playing facility standards, and who will determine the frequency and timing of their inspections.

(c) FAILURE TO MEET BALLPARK STANDARDS. The inspectors shall cite any failures to comply with the agreed standards and shall notify the President of the Minor League Association and the Commissioner or the Commissioner's designee of such noncompliance. The President of the Minor League Association shall consult



with the Major League Club that has a PDC with the non-complying Minor League Club, with the Commissioner or the Commissioner's designee and with the Minor League Club itself. The President of the Minor League Association shall determine, in consultation with the Commissioner or the Commissioner's designee, the specific measures the Minor League Club must take to achieve compliance and a timetable for achieving such compliance. The President of the Minor League Association shall then promptly notify such Minor League Club of such measures and timetable. Before the expiration of the required compliance timetable, the Minor League Club may request an extension of the timetable or a variance from the required compliance measures (see Rule 58(a) (Standards)) upon a showing to the President of the Minor League Association of good cause.

If the Minor League Club fails to achieve such compliance with respect to playing field and other team facilities within the time specified and has not received a variance from such compliance, the President of the Minor League Association shall consult with the Commissioner or the Commissioner's designee about appropriate punitive or remedial action against the Club, its owner(s) and/or its League. Such punitive or remedial action may include, without limitation, fines not exceeding $250,000 and suspensions of Minor League Club owners and/or personnel. After consultation with the Commissioner or the Commissioner's designee, the President of the Minor League Association shall then impose such punitive and/or remedial action against the Club, its owner, and/or its League as the President shall determine is appropriate under the circumstances. In addition to other punitive or remedial action that the President of the Minor League Association may impose, if, after investigation and consultation with the Commissioner or the Commissioner's designee, the President of the Minor League Association determines that the Minor League Club has no good cause for its failure, the President of the Minor League Association shall order the PDC voidable at the option of the Major League Club that is party to the PDC, and shall order the ownership of the Minor League Club to divest its interest in the franchise. In the event that there is a finding of good cause, the President of the Minor League Association, after consultation with the Commissioner or the Commissioner's designee, shall issue a timetable for compliance within the shortest possible period.

If either the Major League Club that has a PDC with a Minor League Club that has been cited for noncompliance or the Commissioner's designee believes that the failure by the President of the Minor League Association to impose a penalty constitutes an abuse of discretion, or that a timetable or extension for compliance or a variance given by the President of the Minor League Association constitutes an abuse of discretion, the Major League Club or the Commissioner's designee may certify the dispute for appeal to the Commissioner under Article II of the Professional Baseball Agreement.

ATTACHMENT 58

MINOR LEAGUE FACILITY STANDARDS AND COMPLIANCE INSPECTION PROCEDURES

Standards

Unless expressed as recommendations, these facility standards are minimum requirements for all new Minor League facilities. The standards outlined in Sections 11, 12 and 13 are applicable to both new and existing facilities.

New Facilities

Any facility that is scheduled for a construction starting date of January 1, 1991 or later shall be considered a "new facility." All plans for new facilities, including construction time schedules, must be submitted to field inspection personnel designated by the Commissioner's Office and the President of the Minor League Association, for review and approval by the field inspection personnel prior to the start of construction. Such review must be completed within 30 days after submission or the plans shall be deemed approved. If such plans meet the standards they shall be approved. Notwithstanding its facility's designation as a "new facility," a Minor League Club that can demonstrate that its new facility construction planning and approval process was at such a stage as of November 17, 1990 that requiring compliance with a minimum new facilities standard (other than those outlined in Sections 11, 12 and 13) will cause it to suffer a material hardship, may apply to the President of the Minor League Association and to the Commissioner or the Commissioner's designee for a variance from such standard.

Existing Facilities

Any facility other than a "new facility" as defined above shall be considered an "existing facility." All existing facilities must meet the standards outlined in Sections 11, 12 and 13 (playing field and other team facilities) by no later than April 1, 1995. All plans for additions, alterations or renovations of such facilities, including new turf installations, must be submitted to field inspection personnel designated by the Commissioner's Office and to the President of the Minor League Association, for review and approval by the field inspection personnel (including construction time schedules) prior to the start of construction. Such review must be completed within 30 days after submission or the plans shall be deemed approved. If such plans meet the standards they shall be approved.

MAJOR LEAGUE RULES
MLR Attachment 58

TABLE OF CONTENTS

SECTION 1.0 SEATING

This section establishes standards for the number, type and arrangement of seating in all facilities.

1.1 SEATING CAPACITY

Seating capacities shall be established to be appropriate for the size of the Minor League Club's market. Recommended minimum capacities are as listed below. All facilities shall conform with the seating grade, seating distribution and spacing requirements described in sections 1.2, 1.3 and 1.4.

1.1.1	Class AAA Capacity	10,000 seats
1.1.2	Class AA Capacity	6,000 seats
1.1.3	Class A Capacity	4,000 seats
1.1.4	Short-Season Class A/Rookie	2,500 seats

1.2 GRADES OF SEATING

In order to enhance the professional atmosphere of the facility, each facility shall provide a minimum of two separate and distinct grades of seating (three separate and distinct grades are recommended). This provision is intended to designate and define general types of seating and not to define pricing or ticketing structures.

1.2.1 TYPES OF SEATING

Seating types shall be defined as in sections 1.2.2, 1.2.3, and 1.2.4.

1.2.2 BOX SEATING

Defined as Arm Chair Seats with Backs. Additional seat width and leg room is recommended, with an additional three inches of tread width to be provided as compared to the tread width in the other seating areas. Following the traditional definition of box seating, it is recommended that additional access to smaller groupings of box seats be provided.

1.2.3 RESERVED SEATING

Defined as a bench with back as a minimum requirement.

1.2.4 GENERAL ADMISSION SEATING

Defined as a bench as a minimum requirement.

1.3 SEATING DISTRIBUTION

In no event shall more than 90% of the total seating capacity be General Admission seating. Recommended seating distributions are as follows.

For two grades of seating:

Box or Reserved:	25% of total capacity
General Admission:	75% of total capacity

For three grades of seating:

Box:	25% of total capacity
Reserved:	25% of total capacity
General Admission:	50% of total capacity

1.4 SEAT SPACING

The spacing and layout of all seating, aisles, vomitories, cross-aisles and concourses comprising the established exiting system shall conform to all applicable local, state and federal codes and regulations. (NFPA 101 for Assembly Occupancies

shall be considered the minimum requirement if the facility does not fall under jurisdiction of other regulations.)

1.5 HANDICAPPED ACCESSIBILITY

All facilities shall comply with all applicable local, state and federal codes and regulations regarding access of Handicapped patrons and employees. (ANSI.A117-1 shall be considered the minimum requirements.)

SECTION 2.0. PUBLIC COMFORT STATIONS

This section determines and defines the number of plumbing fixtures and their arrangement at the facilities.

2.1 COMFORT STATION DISTRIBUTION

The distribution of the fixtures should be in accordance with the distribution of the seating locations and exiting system to allow minimal walking distances from all parts of the facility to public toilet facilities.

2.2 PLUMBING FIXTURES

The minimum plumbing fixture ratios shall be as follows:

Water closets	1:125 Women 1:450 Men
Lavatories (sinks)	1:150 Women 1:150 Men
Urinals	1:125 men

2.2.1 COMFORT STATION ACCESSORIES

All public restroom facilities shall provide mirrors, purse shelves (in women's), hand drying facilities and trash cans. It is recommended that a table/platform for diaper changing be located in each restroom.

2.3 HANDICAPPED ACCESSIBILITIES

All facilities shall comply with all applicable local, state and federal codes and regulations (ANSI. A117-1). It is recommended that all facilities provide a minimum of one, unisex h.c. toilet facility per level. This facility shall be similar to a residential bathroom, and allow a h.c. patron to use the facility with the assistance of his/her companion of the opposite sex.

2.4 DRINKING FOUNTAINS

All facilities shall provide drinking fountains per local, state and federal codes and regulations.

2.5 PUBLIC TELEPHONES

All facilities shall provide telephones per local, state and federal codes and regulations.

SECTION 3.0 CONCESSION AND VENDING

The following standards for Concessions and Vending are recommended for all facilities. Many of the conditions may be affected by an existing operational agreement between the facility and concessionaire. It is recommended that these standards be incorporated into any new operational agreement negotiated after the effective date of this PBA.

3.1 CONCESSION AREAS

It is recommended all facilities provide 5 lineal feet of counter space (with corresponding support space) per 350 seats in the total facility capacity. The distribution of the concession areas shall be commensurate with the distribution of the patrons to minimize walking distances. [Example: 12,000 seats/350 = 34.28 X 5' = 171 lineal feet of counter. Each stand averages 25' per stand. Therefore, a minimum of 7 stands, distributed throughout the facility are recommended.]

3.2 CONCESSION VENDORS

If concession vendors are provided at the facility, the following ratios are recommended: one vendor per 350 seats, with 15 sq. ft. of vending commissary space for each vendor separate from the concession areas.

3.3 CONCESSION COMPLIANCE/CODES AND REGULATIONS

Concessionaires are responsible for compliance with all local, state and federal regulations in regard to Health Standards, Fire Department regulations, power, exhaust and ventilation requirements. The agreement between the facility and concessionaire shall define which party is responsible for required modifications.

3.4 CONCESSION STORAGE AND NOVELTY STANDS

The following standards shall be minimum requirements.

3.4.1 CONCESSION STORAGE

All facilities shall provide adequate storage for concession inventory. It is recommended that the storage area be of such size to store the inventory necessary to stage the number of games in an average home stand. In the Agreement between the facility and the concessionaire, the concessionaire shall provide empirical data to determine the required amount of storage space.

3.4.2 NOVELTY STANDS

Any provided novelty stand(s) acting as a sales point for retail sales shall present products in a professional manner commensurate with standard retail sales areas.

SECTION 4.0 MISCELLANEOUS PUBLIC AREAS

4.1 STADIUM CLUB/RESTAURANT/BANQUET FACILITY

This type of facility shall be optional.

4.2 PICNIC/BEER GARDEN FACILITY

This type of facility shall be optional.

4.3 FAMILY RECREATION AREA

This type of facility shall be optional.

SECTION 5.0 TICKET WINDOWS AND ENTRY TURNSTILES

The following Sections 5.1, 5.2, and 5.3 shall be minimum requirements.

5.1 TICKET WINDOWS

All facilities shall provide one ticket window for each 1500 seats of total capacity.

5.2 TURNSTILES/ENTRY POSITIONS

All facilities shall provide one turnstile or equivalent entry position (minimum of 30" wide) for each 1500 seats of total capacity.

5.3 HANDICAPPED ACCESSIBILITY

All facilities shall provide access per all applicable local, state and federal codes and regulations to all public and private areas of the facility. (ANSI A117.1)

SECTION 6.0 SECURITY AND FIRST AID

6.1 SECURITY COMMAND POST

All facilities shall provide a "command post" for event security forces, centrally located with provisions for removing unruly patrons from the facility.

6.2 FIRST AID STATION

All facilities shall provide a first aid station during all events. It is recommended that certified medical personnel staff the station at all events.

SECTION 7.0 PARKING AND FACILITY ACCESS

The following Sections 7.1, 7.2 and 7.3 shall be applicable to all facilities.

7.1 PARKING SPACES

It is recommended all facilities shall provide public parking spaces at a ratio of 1 space per 3 seats of total capacity. Such parking spaces shall be on-site or within a 10 minute (1/2 mile) walking distance of the stadium.

7.2 ACCESS AND CONTROL

All facilities shall coordinate with local law enforcement officials to provide controlled on-site traffic access, so as to promote a safe and trouble-free access environment.

7.3 HANDICAPPED PARKING

All facilities shall conform with all applicable local, state and federal regulations.

SECTION 8.0 SOUND SYSTEM AND SCOREBOARD

8.1 SOUND SYSTEM

All facilities shall provide an acoustically balanced sound system integrated with the capacity to deliver clear audio messages to the press box, concourses and all public areas within the facility.

8.2 SCOREBOARD

All facilities shall provide a scoreboard that provides the following as minimum requirements. All scoreboard characters are to be large enough to be seen throughout the facility.

Line Score
Ball-Strike-Out
Player at Bat

8.3 SCOREBOARD LOCATION

No part of any scoreboard and/or associated lighted advertising panels may be located within 50' of the center line of the playing field.

8.4 CLOCK

All facilities shall provide a time-of-day clock that is in full view of all field personnel from the beginning of batting practice through the close of each game.

SECTION 9.0 MEDIA FACILITIES

9.1 PRESS PARKING AND ACCESS

It is recommended that all facilities provide a parking area for all members of the media with direct access to the facility. It is also recommended that parking be provided for television vans and broadcast trucks.

9.2 PUBLIC ADDRESS/SCOREBOARD PERSONNEL

All facilities shall provide space in the press box for the public address announcer and scoreboard operator(s). It is recommended that the PA/scoreboard area have a minimum of 50 sq. ft. of floor space in addition to the floor space required for the scoreboard equipment.

9.3 RADIO BROADCAST BOOTHS

It is recommended that all facilities provide two radio broadcast booths (home and visitor) that provide a direct view of the entire field and facilitate the broadcast of the game. Each shall provide counters, chairs, power, lighting and telephone jack.

9.4 TELEVISION BROADCAST AND CAMERA BOOTH

It is recommended that all facilities provide a spare broadcast/camera booth available for local television broadcasts and local television media. The booth should have a direct view of the entire field with operable windows or closures.

9.5 PRINT MEDIA AREA

It is recommended that all facilities provide a separate area for 6 to 10 members of the print media with a direct view of the entire field. Counter, chairs, power, lighting and telephone jack shall be provided.

9.6 MEDIA TOILET FACILITIES

It is recommended that all facilities provide media restroom facilities separate from public restrooms, located with direct access to the press box.

9.7 MEDIA WORKROOM/LOUNGE

This type of facility shall be optional.

9.8 HANDICAPPED ACCESSIBILITY TO PRESS BOX

Facilities shall conform to all applicable local, state and federal codes and regulations for accessibility to the press box. (ANSI-A117.1)

SECTION 10.0 ADMINISTRATION AREA

10.1 FACILITY ADMINISTRATION AREA

It is recommended that all facilities provide administrative space of 250-300 sq. ft. per person for facility and maintenance operations with separate toilet facilities directly adjacent.

10.2 STADIUM PERSONNEL DRESSING/LOCKER FACILITIES

It is recommended that all facilities provide separate dressing/locker facilities (separate for each sex) for all maintenance and event employees (including concession personnel) separate from the public.

10.2.1 STADIUM PERSONNEL TOILET FACILITIES

It is recommended that all facilities provide toilet facilities for stadium personnel separate from the public. Direct access to personnel locker rooms is desirable.

10.3 TEAM ADMINISTRATION AREA

If the tenant team has a permanent administration area away from the facility, an on-site game day team administration area must be provided. If the team's permanent administration area is at the facility, it is recommended that the area provide 250-300 sq. ft. per person for team operations with adjacent toilet facilities.

SECTION 11.0 TEAM FACILITIES

The following shall be minimum requirements.

11.1 HOME CLUBHOUSE/DRESSING AREA

The number of lockers provided shall be at least five more than the Club's active player limit for its classification of play. The minimum size of each locker shall be 24"

w x 72" h (36" w x 72" h is recommended). A lockable storage compartment is recommended for each locker.

Minimum floorspace requirements for the team dressing area shall be as follows:

New facility: 1,000 sq. ft.
Existing facility: 800 sq. ft. (1,000 sq. ft. is recommended)

11.2 SHOWER AND TOILET FACILITIES

All facilities shall provide separate shower, drying and toilet areas with the following minimum fixture counts:

New facility:	shower heads:	8 (10 recommended)
	water closets:	2
	urinals:	2
	lavatories:	4 (8 recommended)
Existing facilities:	shower heads:	6 (10 recommended)
	water closets:	2
	urinals:	2
	lavatories:	2 (8 recommended)

11.3 TRAINING ROOM

All new facilities shall provide a separate training room of not less than 300 sq. ft. divided into three areas: treatment, whirlpool and rehabilitation. The training room shall have space for 1 or 2 treatment tables, a minimum of 2 whirlpools, hydroculator (4-pack minimum), scale, stationary bicycle, ice machine and an area for 2 or 3 pieces of rehabilitation/weight equipment. The training room shall contain a lockable storage area for training supplies. It is recommended that additional space be provided for a separate office/dressing area for the trainer and team physician. It is also recommended that a valuable storage box be installed in the training room.

All existing facilities shall comply with the above paragraph, with the exception that the minimum square footage requirement shall be 175 sq. ft. (300 sq. ft. is recommended).

11.4 TEAM LAUNDRY FACILITY

All facilities shall provide commercial quality laundry facilities (washer and dryer) for the home team to provide daily washing capability. This room may be combined with the Team Equipment Room.

11.5 TEAM EQUIPMENT ROOM

All facilities shall provide adequate lockable equipment storage space (minimum of 300 sq. ft. in a new facility) contiguous with the clubhouse.

11.6 COACHES' LOCKERS

All new facilities shall provide a minimum of 4 coaches lockers (6 are recommended) in addition to the players lockers. It is recommended these lockers shall be in a separate area from the players lockers. Locker size and floor space requirements (per capita) shall be the same as in the players dressing area.

Existing facilities shall comply with the above paragraph, with the exception that a minimum of 3 coaches lockers are to be provided.

11.7 FIELD MANAGER'S OFFICE

All facilities shall provide a field manager's office with direct access to the home clubhouse. It shall include a separate toilet, shower and dressing area, along with a desk and adequate meeting space for 6-8 persons. At existing facilities the separate toilet, shower and dressing area is recommended and not required.

11.8 VISITORS CLUBHOUSE/DRESSING AREA

The number of lockers provided shall be at least three more than the Club's active player limit for its classification of play. Minimum floor space requirements shall be as follows:

New facility: 750 sq. ft.
Existing facility: 500 sq. ft (750 sq. ft. is recommended)

11.9 VISITORS SHOWER AND TOILET FACILITIES

All facilities shall provide separate shower, drying and toilet facilities with minimum fixture counts as follows:

New facility:	showers heads:	6 (8 recommended)
	water closets:	2
	urinals:	2
	lavatories:	4
Existing facility:	shower heads:	4 (8 recommended)
	water closets:	2
	urinals:	2
	lavatories:	2 (4 recommended)

11.10 VISITORS TRAINING ROOM

All new facilities shall provide a separate training room (minimum of 150 sq. ft.), with space for one training table, one whirlpool, and a hydroculator (4-pack minimum). In existing facilities, this area may be integrated into the players' dressing area, provided that the dressing area is at least 650 sq. ft.

11.11 VISITING FIELD MANAGER'S OFFICE

All facilities shall provide a separate office for the visiting field manager. It shall include a separate toilet, shower and dressing area, along with a desk and adequate meeting space for 2-4 people. At existing facilities, the separate toilet, shower and dressing area is recommended and not required.

11.12 TEAM STORAGE (MAJOR LEAGUE PARENT TEAM)

It is recommended that all facilities provide a minimum of 300 sq. ft. of lockable team storage, separate from other team storage, with year round access only to the major league team.

11.13 UMPIRE FACILITIES

All facilities shall provide a private dressing, shower, and toilet facility for umpires. This area shall provide enough lockers (each a minimum of 36" w x 72" h) to accommodate the number of umpires typically assigned to work in the applicable classification of play. In new facilities, this area shall be a minimum of 200 sq. ft.

11.14 FIELD/DUGOUT ACCESS

It is required that all new facilities and recommended that all existing facilities provide a direct access route to the dugout/playing field. Similar access is to be provided for the umpires.

11.15 PLAYER PARKING

It is recommended that all facilities designate a parking area with clubhouse access for players and other uniformed team personnel.

11.16 HITTING/PITCHING TUNNELS

It is recommended that each facility provide two covered tunnels for players to practice hitting and pitching in an enclosed environment. If provided, these tunnels should be reasonably close to the home clubhouse with minimal public access.

11.17 PRE- AND POST-GAME WAITING AREA

It is recommended that all facilities provide a pre-game and post-game waiting area for families of players and other uniformed personnel.

SECTION 12.0 PLAYING FIELD

12.1 FIELD DIMENSIONS

Layouts of all new fields (and modifications to existing fields) shall be submitted for approval by the parent Major League Club and the Minor League Club. All field dimensions shall comply with the minimum dimensions specified in Section 1.04 of the Official Baseball Rules.

12.2 PLAYING SURFACE

All facilities shall provide a field surface (natural or synthetic) without defects and/or "trip-hazards" that could affect the normal play of the game or jeopardize player safety. Warning track material shall identify all zones within 15' of all walls and fences. This warning track must be of a material to provide visual and tactile notice of a significant change in surface type.

12.3 FIELD GRADE

The maximum allowable grade from the base of the pitcher's mound to the warning track in foul territory shall be 6". The maximum allowable grade from second base to the outfield warning track shall be 20".

12.4 FIELD WALL

The permanent outfield wall or fence in all new facilities shall be a minimum of 8' high.

12.5 BULLPENS

All facilities must provide a bullpen area for each team. These areas may be located in foul territory down the baselines or just immediately outside the field wall. Each must be visible to both dugouts and to the press box. Each shall have two regulation pitching mounds and home plates, adequate distance and clearance for each pitcher and catcher, and a bench for 10 players. If the bullpens are in foul ball areas, care shall be taken to integrate the slope of the pitcher's mound into the field so as not to create a trip hazard for fielders as they approach the bullpen. It is recommended that all facilities have phones connecting the bullpens to the dugouts.

12.6 DUGOUTS

All facilities must provide two enclosed dugouts (home and visitor). Each dugout in a new facility must accommodate 25-30 uniformed personnel on a bench with seatback. Each dugout in an existing facility shall accommodate 20-25 uniformed personnel. Each dugout must have a helmet rack for a minimum of 15 helmets and a bat rack for a minimum of 30 bats. It is recommended that a bat swing/storage area be directly accessible to each dugout. It is recommended that each dugout include a refrigerated water cooler (drinking fountain) and provide direct access to a restroom. It is recommended that all facilities have telephones connecting the dugouts to the bullpens and to the press box. All dugouts shall provide as feasible an anti-skid surface as possible on steps and walkways.

12.7 FIELD EQUIPMENT

All facilities shall provide the following field equipment. Examples given shall serve as guidelines for equipment quality, and the equipment provided shall meet or exceed the examples specified.

12.7.1 BATTING CAGE

All facilities shall provide a full cover batting cage. New batting cages shall have minimum dimensions of 18' wide, 14' deep and 9' high. It is recommended that the cage be portable and made of an aluminum frame to provide maximum maintainability. Existing batting cages not meeting the above standards may be approved by the parent Major League Club.

12.7.2 FIELD SCREENS

All facilities shall provide a pitching screen, first base screen, 2nd base/double play screen, and a shag protector screen. New screens shall have the following minimum dimensions:

Pitching screen: 7' h x 8' w with 4' x 4' notch in upper corner.

Double play screen: 7' h x 14' w with hinged wings.

First base and
shag protector screens: 7' h x 8' w.

All existing screens not meeting the above standards may be approved by the parent Major League Club.

Periodic checks of the batting cage and all screens shall be performed to verify frame and net integrity.

12.7.3 BATTER'S EYE

All facilities shall provide a solid monochromatic batter's eye painted in a flat, dark color with minimum dimensions of 16' high and 40' wide centered in the outfield. If a centerfield camera is integrated into the batter's eye, the camera must be the same color as the batter's eye. It is recommended that all new facilities provide a batter's eye with minimum dimensions of 40' high and 80' wide. Any advertising sign abutting the batter's eye shall not include white lettering, a white background, any neon or other lighting or motion effects.

12.7.4 FOUL POLES

All facilities shall provide two foul poles of a bright color that are a minimum of 30' high (45' is recommended) with a screen to the fair side of

the pole. No white signs shall be allowed on or immediately adjacent to each side of the foul pole.

12.7.5 FLAG POLE

All facilities shall provide a flag pole for the United States Flag or Canadian Flag, as applicable, in clear view of the entire seating bowl.

12.7.6 SCOREBOARDS, VIDEO MONITORS AND MOTION SIGNS

In addition to other provisions of these Minor League Facility Standards (including, but not limited to, Section 8.3 (Scoreboard Location)), the President of the Minor League Association, in consultation with the Commissioner or the Commissioner's designee, shall develop and distribute guidelines regarding the use and location of scoreboards, video monitors, LED boards and LED/matrix boards so as not to interfere with play.

12.8 FIELD LIGHTING

All new lighting systems shall maintain the following minimum brightness requirements after 100 hours of burning:

Class AAA and Class AA:	100 fc average in infield/ 70 fc average in outfield.
Class A and Rookie:	70 fc average in infield/ 50 fc average in outfield.

The height and location of poles in all new lighting systems shall follow IES standards.

All existing lighting systems shall maintain the following minimum brightness requirements:

Class AAA and Class AA:	70 fc average in infield/ 50 fc average in outfield.
Class A and Rookie:	60 fc average in infield/ 40 fc average in outfield.

All lighting systems shall operate with a maximum variance ratio of 1.2/1 in the infield and 2/1 in the outfield. The variance ratios shall be computed by comparing the highest and lowest footcandle readings in the infield and the outfield.

12.9 BATTING CAGE GATE

All new facilities shall provide a gate large enough to allow the batting cage to be freely taken to and from the playing field.

12.10 BACKSTOP

All facilities shall provide a backstop behind home plate. The configuration and dimensions shall vary due to sight-lines for the press box and insurance requirements for the facility. Periodic inspections shall be performed to insure the integrity of the backstop.

12.11 PLAYING FIELD TARPS

All Class AAA, Class AA and full season Class A facilities shall provide a full infield tarp and pitcher's mound, home plate, base pit, and bullpen tarps, except that this requirement may be waived by the President of the Minor League Association in the event that the facility is located in an area that does not experience sufficient rainfall to justify the expense of tarps. The tarps shall be oversized to prevent water from running under the edge to a dirt area. The tarps shall be stored in an easily accessible location but in a way not to create a safety hazard on the playing field. Each facility is required to provide adequate manpower to operate the placement and/or removal of the tarps.

SECTION 13.0 MAINTENANCE

This section outlines requirements and recommendations for overall maintenance of the facility and playing field in a professional manner.

13.1 FACILITY MAINTENANCE AND CLEANLINESS

Each facility shall develop a maintenance program (both short-term and long-term) for use by its maintenance personnel. All public areas shall be completely free of trash and rubbish at the opening of each event, and stadium personnel shall be responsible for cleanliness during the event.

Each facility shall follow its maintenance program for interior repairs and touch-ups to maintain the professional atmosphere of the facility. Long-term maintenance

shall be ongoing in order to deter major facility problems and to minimize potential disruptions to the public.

13.2 FIELD MAINTENANCE

The playing field shall be maintained at the highest possible professional level. Every reasonable effort shall be made to insure the safety of the players and the smooth play of the game. The facility shall follow professional grounds- keeping practices and shall utilize proper maintenance equipment. Nail-drags, screens, tampers and rakes are recommended to maintain all dirt areas. Proper turf care equipment (mowers, tractors, etc.) shall be used, and an appropriate maintenance plan shall be developed and followed to care for the playing field.

13.2.1 PLAYING FIELD RECONDITIONING

The pitcher's mound and base pit areas shall be reconditioned prior to each game through the use of clay materials and tampers.

13.2.2 FIELD MAINTENANCE MATERIALS

All facilities are required to have a sufficient amount of drying material on hand at all times for reconditioning the infield. A chemical drying agent and/or calsonite clay may be used in combination with sand to stabilize areas affected by excessive moisture. Sand may not be the sole drying agent.

13.2.3 LAYOUT OF PLAYING FIELD

The entire playing field shall be laid out to coincide with the provisions of Sections 1.04 through 1.08 of the Official Baseball Rules.

13.2.4 IRRIGATION SYSTEM

All new facilities shall provide a full field irrigation system as well as water lines 1 1/2" or larger behind both home plate and second base for watering the infield grass and base pit areas. It is recommended that a series of water outlets 1" or larger be distributed around the playing field in order to water the field if the irrigation system should become inoperable. It is recommended that a full-field irrigation system be provided at all existing facilities.

13.2.5 FIELD DRAINAGE SYSTEM

All new facilities shall provide an underfield drainage system integrated into the subbase of the turf (natural or synthetic) surface. This system shall be a system of a drain tile fields in a porous collection bed (or similar system) below the turf base.

It is recommended an optimal slope of .5% be maintained from the base of the pitcher's mound to the baselines and from second base to the outfield warning track.

BRICKMAN

Project: **Boyce Cox Field – Bristol Sox**

Days on site: **June 17 – June 21, 2012**

Re: **Field Observation and Update Report**

All,

Attached is an update and recap of the opening series at Boyce Cox Field in Bristol, Virginia.

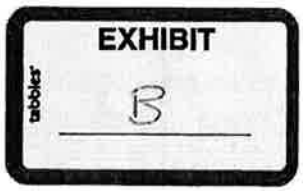
At this time, a full time turf manager has not been hired. This remains to be the best option for maintaining the field for professional play. I discussed Brickman Sport Turf put someone onsite for the season, or longer term. However, Bristol Baseball does not want to commit to hiring someone long term until something is worked out between the Bristol Sox and Bristol Baseball.

Currently, Bristol Sox hired three college students to work on the field daily and are responsible for setting up the field for games, packing mounds, dragging, etc.. In addition, the city has allowed one person to assist with daily field maintenance. This person is available Monday – Friday from 8- 4:30 (non game days) and 8 – 7:00pm (game days). The city also mows the outfield in one direction two to three times Monday – Friday (which is not enough).

During my visit, I focused on training the field crew on how to maintain and prep the field for games. They did a great job with pre and post game maintenance operations prior to my departure. However, it is not possible to teach everything there is to know in four days. Typically, we require new assistants to work under the guidance of a qualified head groundskeeper for two – three years before assigning them head groundskeeper responsibilities. In addition, the field crew worked with me during the renovation, so they understand how things were constructed and should be able to correct any issues.

My plan is to provide the field crew with a daily check list for game days and non game days that they can use to ensure all items are covered.

Mahlon is working on getting the city's golf course superintendent to provide oversight for the turf. Mahlon and I met with the golf course superintendent and discussed ways he could assist the city to ensure proper IPM, irrigation, aerification, fertility programs are completed on a regular basis. Nothing was finalized and the city is still maintaining the turf the same way. I recommended mowing the field every game day (one direction), or every other day (double cut in two directions) and on weekends. Mowing remains to be an issue; mowers need to be sharpened and are not cutting. The reels on the triplex mower are not adjusted daily prior to cutting the field. I trained (Zach, field crew) on how to



adjust the walk behind mower for the infield and he has been cutting the infield daily, so the city only mows the outfield.

The irrigation system does not provide uniform coverage across turf areas. I observed many areas that were not receiving water. If consistent rainfall is not received, expect areas of turf to be lost or thinned to due to lack of water. The irrigation system is poorly designed and maintained. Many of the rotors water over the dirt, over the clubhouse and into the stands. It's a very inefficient system. After the game on Monday, the irrigation system was set to run during the night and a valve (turns the head on and off) stuck open and saturated an area behind 1st base. It was reported to the city, but nothing was fixed during my visit. The system should not be used unattended (which is not ideal). I highly recommend installing a new irrigation system after the season. This was a contributing factor with having to cancel the game on Wednesday night, along with not having enough people to put the tarp on in a timely manner. I also observed many irrigation heads in the outfield and infield that were low and need to be raised.

Currently, the big field tarp is not adequately staffed. It was put on the field with six people twice in three days. This is not recommended and personnel injury and/or lost games will result. The Bristol Sox do not employ a front office staff, so no one is onsite to assist the field crew with deploying the tarp as needed to protect the field. The city does not pull tarp, however they did help dump the tarp one time. I recommend providing the necessary people to properly manage the tarp. A minimum of 12 people are needed to put the tarp on and off the field.

City Parks and Recreation Personnel – Provide staff from 8 am – 4:30 pm

Jobs Corps Personnel – 4:30 pm – until after the game(and weekend days)

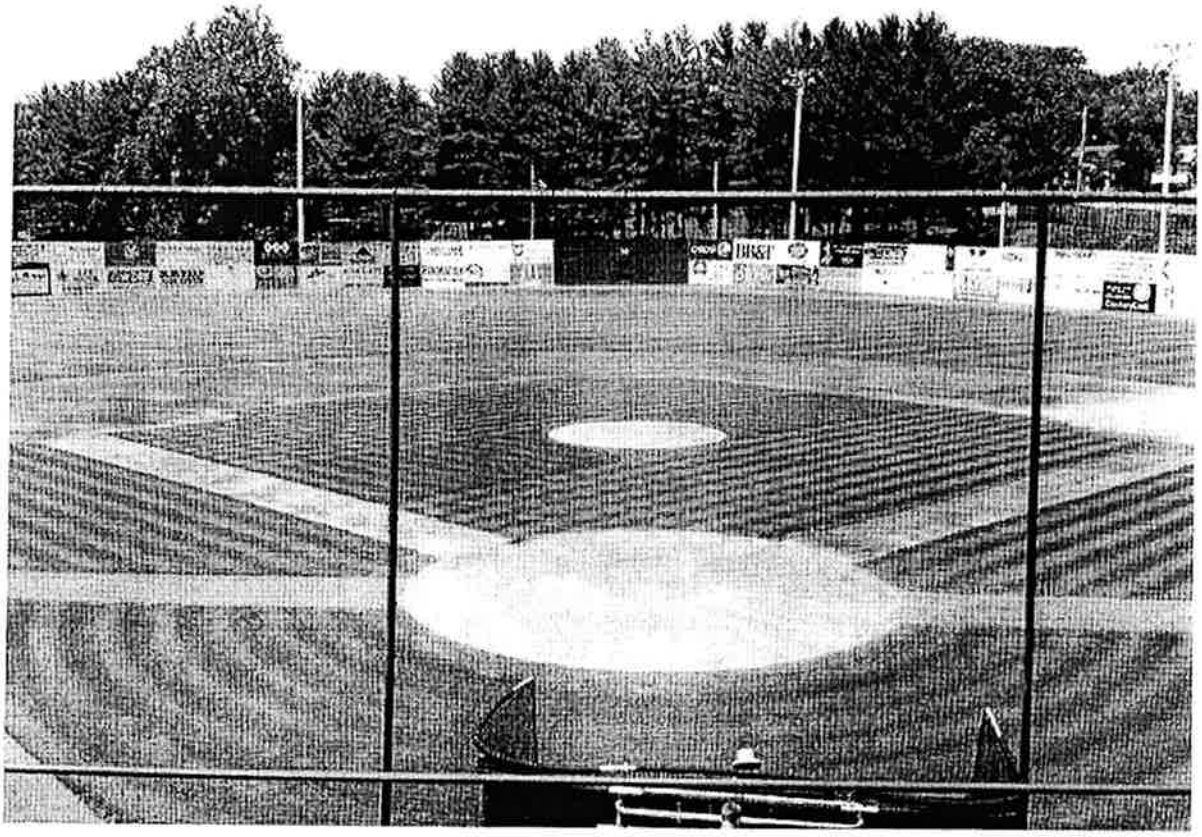
Also, it is recommended to Install a computer in the grounds area so the field crew can check the radar often and make good decisions for the field. Mahlon was working on this and it should already be completed.

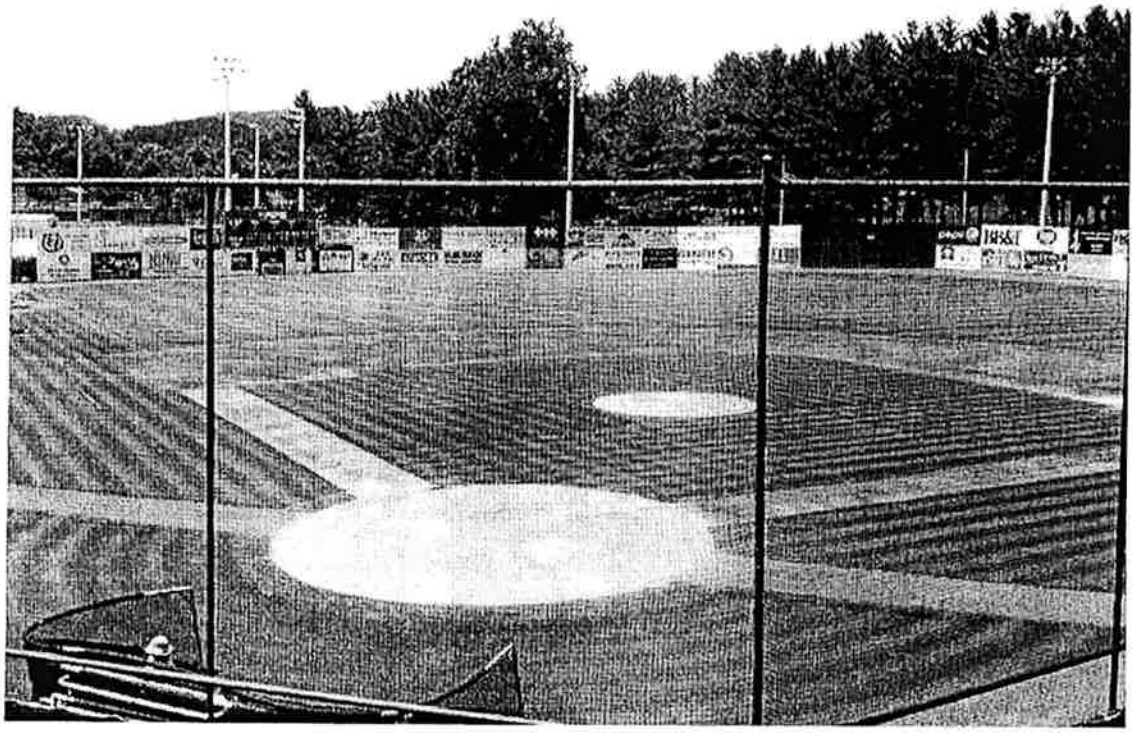
Overall, the infield and mounds played great. The outfield still has a lot of grading problems and needs to be replaced after the season, along with the irrigation system. The renovations completed were big improvements and Pete Rose Jr. (Field Manager for the Sox) was happy to see them. I spoke with Lee Landers (Appalachian League President) and he was impressed with the way the field looked.... Best he's ever seen the field. The field is old which makes it even more challenging to manage than a newer field. This remains a concern with an inexperienced field crew. However, they have learned a lot, hard working, played college baseball and appear committed to maintaining the field.

After the Sox baseball season, the city will resume all maintenance related duties and I would plan on having to complete a similar renovation next year because the field is heavily used by the high school and college teams. A full time turf manager is needed for the entire year to properly manage and oversee the field.

If a full time turf manager is not hired. I recommend making site visits during the season to make sure the field continues to be maintained. Mahlon and I had conversations regarding site visits during the season and he was for it.

Field Overview Pictures (opening series) – See Below





Turf Management update and Comments:

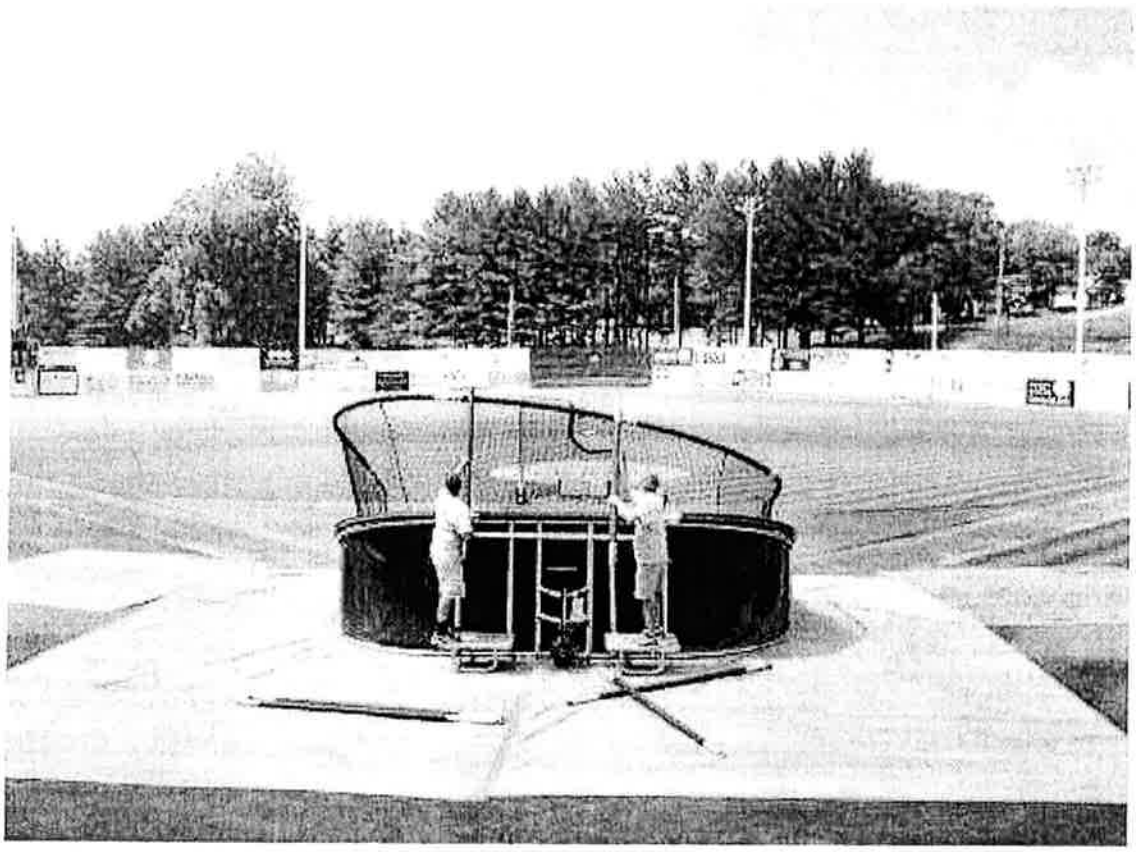
Mowing

- Currently, the city parks and recreation department is responsible for all turf applications and mowing
- Mowers are not cutting and need to be sharpened.
- The city is not mowing the field as needed for professional baseball.
- I recommended mowing every game day and every other day when the team is out of town.
- Mowing the outfield remains to be an issue and has not been resolved.

Fertility and Cultural Practices

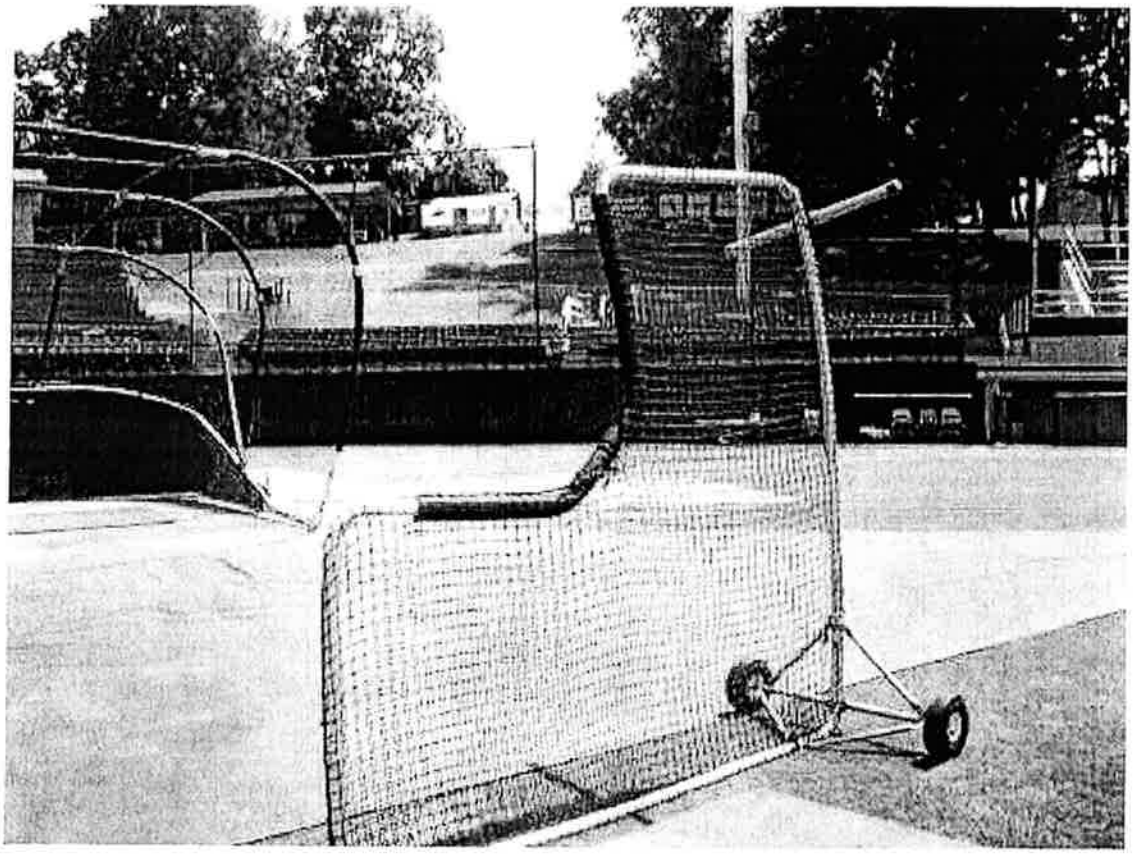
- This City is not maintaining turf adequately for professional baseball
- Observed, nut sedge, crabgrass and other weeds in the outfield.
- The city did not apply a pre emergent herbicide so crabgrass will be an issue in the outfield all season. A post emergent herbicide could be applied but will leave bare areas in the outfield, so it's not recommended.

- Mahlon is working on having the City's golf course superintendent provide oversight and direction to parks staff on best turf management practices.
- Met with Mahlon and golf superintendent regarding a turf program. This option would help the turf and is better than what the Parks department is currently completing.



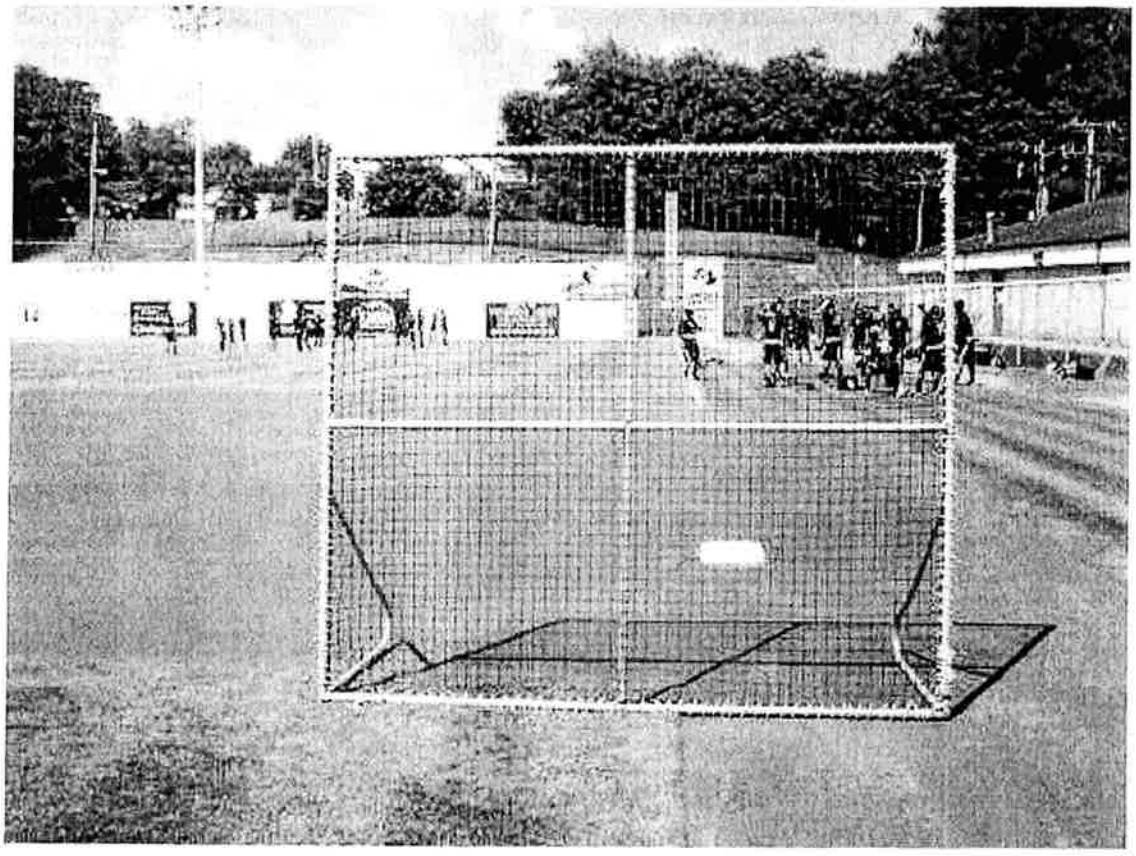
Portable Batting Cage

- Some of the risers do not lock in place and need to be fixed. Potential player safety issue.



Pitching Screen

- Bent up and needs to be replaced with a larger screen – recommend 8' x 8' fully padded L – screen
- Provided Mahlon with C&h Baseball's contact information

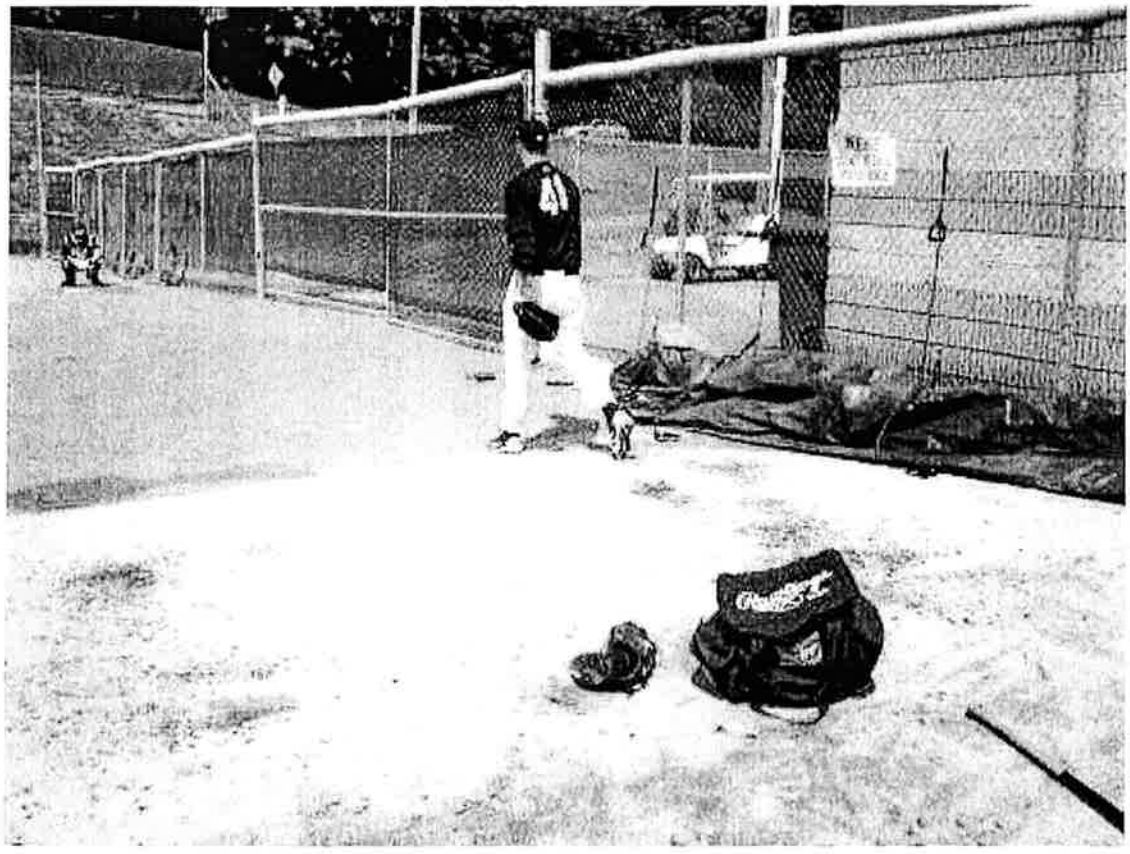


Base Screens

- Recommend larger base screens

Bull pen home plate areas

- Home plate spacing is 8' on center
- Concrete pad could be extended to the right to give the catcher more room
- Painted new plates on synthetic turf

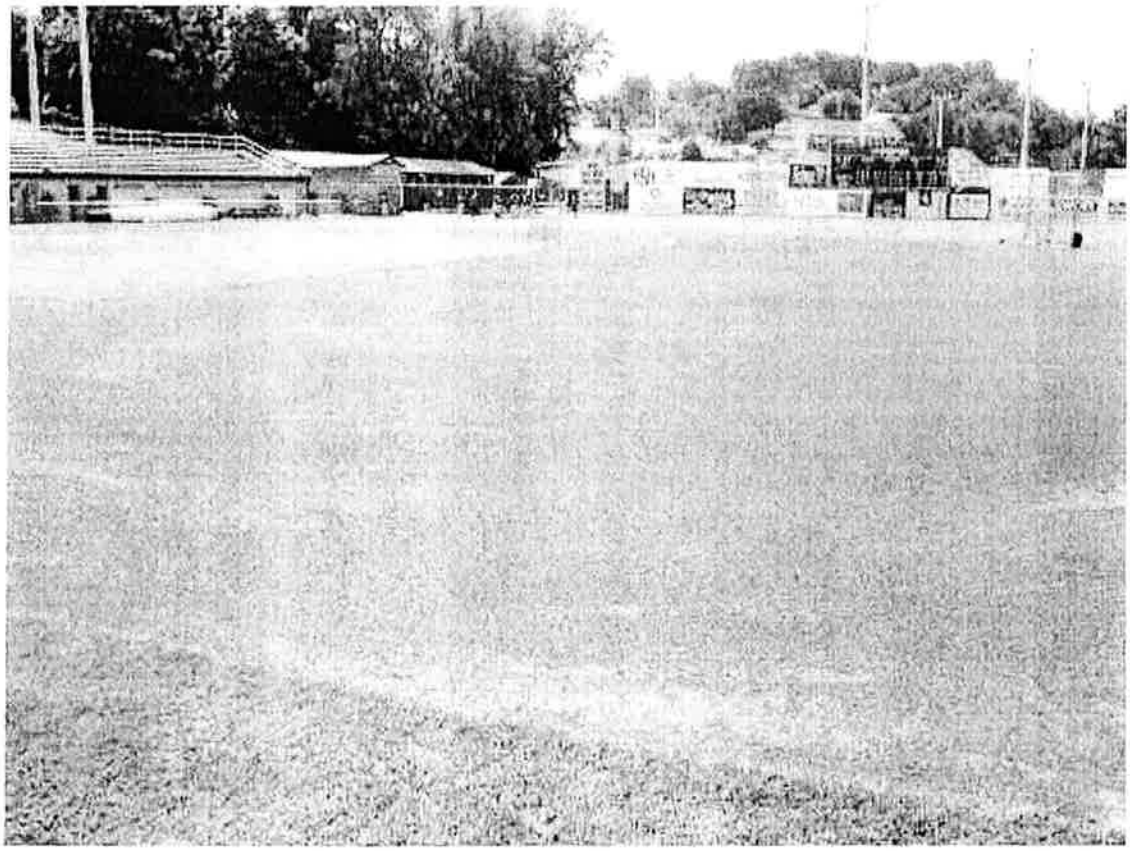


Bull pen Mounds, Mounds and Home plate

- All of the mounds and home plate areas held up great
- Trained field crew on proper maintenance practices.
- Field crew was packing all clay areas prior to me leaving and doing a good job.
- Need to purchase custom vinyl tarps for the bull pens.
- Need to purchase new pitching mound tarp – current tarp has a small hole in the center of the tarp. In the meantime, place a mat underneath the tarp.

Skin Management

- Spent a lot of time with field crew on how to maintain skin and baselines
- City built new nail drag for use on the skin
- Discussed water and how to maintain adequate moisture in skin
- How to wash material build up out in lips
- Different ways to water i.e. soak, shine, and game time watering
- Importance of knowing weather forecast prior to watering
- Field crew made good water management decisions prior to the double header games played on Thursday. The skin was lightly watered prior to the first game because rain was expected. During the game the field took a lot of rain water and required minimal work to get the game finished after the rain delay.
- Field crew got the tarp rolled up and field playable 20 minutes after receiving heavy rain and play resumed – minimal assistance from me.
- Field crew prepped the field for the second game, packed the mound, put chalk lines down and got the second game started 15 minutes after the first game finished.



Field Crew – From Left to Right Chad, Zach, David, Caleb, and Josh.

- Zach, David and Caleb will be responsible for most of the work on the field.
- Brad (City employee) – not in picture should be dedicated to this field and needs to be at all home games to assist David and Zack, or until a full time turf manager is hired.

Tarp Crew and tarp management comments:

- Picture was taken after double header games
- Pulled big tarp on the field with 6 people because it started raining after the game, forecast called for additional rain overnight. The Job corps (tarp crew) had already been sent home. This was an extremely difficult tarp pull.
- It's critical that more people are used to put the tarp on and off the field. Otherwise, someone will get injured.
- The Bristol sox do not have a front office staff to pull the big tarp.
- Currently, students enrolled in a jobs corps program are used. They arrive on site at approximately game time, so the field is without a tarp crew all day long. They did a good job with putting the tarp on the field; recommend having them there earlier and until after the game when the forecast calls for overnight and next day rain. This needs improvement.

- **I recommend that the parks and recreation personnel be responsible for pulling tarp from 8:00 am – 4:30 pm. Jobs corps personnel are used from 4:30pm until after the game including weekends.**

5th inning drag:

- Field crew completed changing bases and raking position player areas.
- Completed in 90 seconds.

Game Day Check List – Field

- Mow Turf
  - ✓ Double cut if field is mowed every other game day
  - ✓ Single cut if field is mowed every game day
- Pack bull pen mounds
- Check mounds, bull pen's and home plate areas are game ready
  - ✓ Maintain consistent moisture level
  - ✓ Plates painted white
  - ✓ Back drag with broom or other – Smooth Finish
  - ✓ Cover with tarp or mats
  - ✓ Add calcined material as needed
- Infield Skin Maintenance
  - ✓ Nail drag as needed
  - ✓ Drag smooth
  - ✓ Hand work edges and 1st and 3rd areas
  - ✓ Add additional calcined clay for consistency
  - ✓ Check weather forecast prior to watering
  - ✓ Water skin i.e. soak, shine, game time water (color)
  - ✓ Broom any calcined material from turf edges
- Baseline Maintenance
  - ✓ Rake smooth
  - ✓ Add calcined clay as needed
  - ✓ Water as needed
- Warning Track
  - ✓ Hand rake around bull pen benches – keep level
  - ✓ Drag with sand pro
  - ✓ Add material to low spots as needed
  - ✓ Sweep brick chips from turf edges
- Hand Water Turf
  - ✓ Water stressed areas, or areas that do not receive adequate water
- Wash Bases
- Pull big tarp as needed to ensure field is playable

Have field ready for use by 1:30 pm on game days.

Pre Game Check List- Field

- Check Team field schedule
- Set up field equipment as needed for batting practice, infield/outfield practice and early work
- Remove Batting Practice equipment promptly after teams finish
- Chalk lines and Batter's and Catchers boxes
- Check moisture in packing clay hydrate with water as necessary
- Drag skin
- Fix base lines
- Water skin prior to game
- Pick up grass divots on infield turf
- Fan Rake nuggets from grass areas
- Sweep calcined clay from turf edges as needed
- Close all field gates
- Remove all maintenance equipment and tools from field
- Check weather radar

Post Game Checklist- Field

- Pack mound and home plate areas
- Fan rake dirt nuggets from grass
- Sweep calcined clay from turf edges
- Drag skin
- Pick up chalk lines
- Back drag, or rake base lines
- Cover mound, home plate and bull pens
- Remove bases
- Pull big tarp as needed

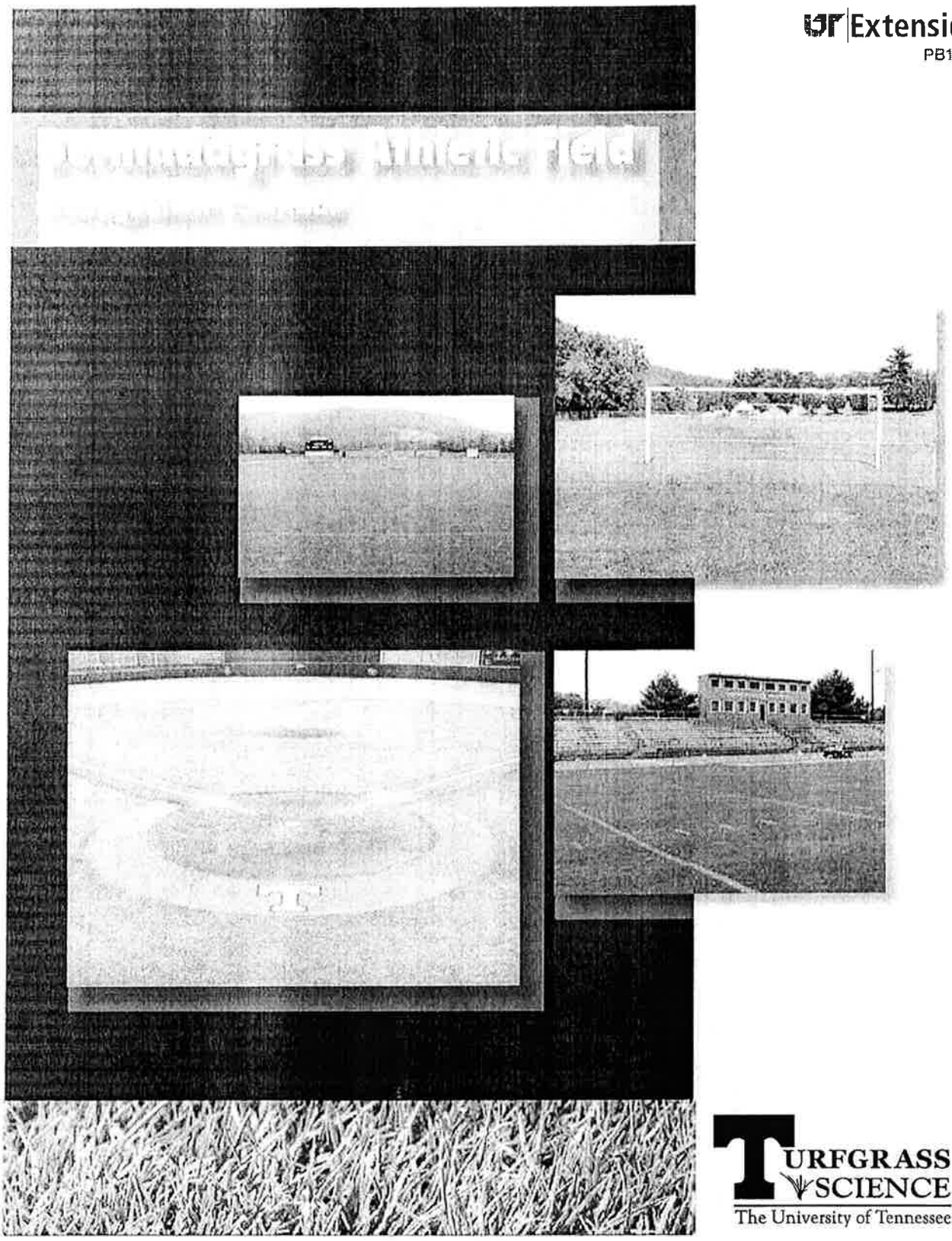
Non Game Day Checklist- Field

- Mounds , Home plate and Bull pens
  - ✓ Remove all calcined material from mound, bull pen and home plate areas. If 1" hose puts out to much water, a smaller diameter hose should be used. This will use less water and infield will dry out quicker.
  - ✓ Add packing clay to ensure areas are level, or have proper slope. Check slopes and correct as necessary
  - ✓ Use a plate compactor to pack home plate, mound and bull pens
  - ✓ Fix any low areas in all areas that are not packing clay
  - ✓ Apply new calcined material and drag smooth
  - ✓ Water as needed
  - ✓ Cover with tarps
- Turf and Dirt Edges
  - ✓ Use water hose to remove any build up from edges (wash out lips)
  - ✓ Make sure you have enough time for the skin to dry out before next event
  - ✓ Backfill with infield mix
  - ✓ Use a small roller to compact
  - ✓ Rake level
  - ✓ Critical to maintain smooth transitions from turf to dirt and turf to warning track
- Skin Maintenance
  - ✓ Use a roller to compact as needed
  - ✓ Fix any low by adding infield mix as needed (especially around bases, and position player areas)
  - ✓ Remove any grass clippings or debris
  - ✓ Add Calcined clay as needed
- Edge turf
  - ✓ Infield and outfield as needed to maintain straight edges
- Turf Applications
  - ✓ Resod when time permits and when needed I.e. high traffic areas, in front of mound, ss, 2nd base player areas, etc.
  - ✓ Apply fertilizer, Herbicide, Insecticide according to Golf Course's Superintendents Schedule
  - ✓ Complete aerifying, vertical mowing, topdressing according to Golf Course's Superintendents Schedule
- Warning Track

- ✓ Backfill edges with material as needed after edging
- ✓ Drag
- ✓ Add material to low areas as needed

- Inventory Materials
  - ✓ Order materials as needed i.e. packing clay, chalk, paint, calcined clay, etc.
- Mowing Schedule
  - ✓ Remove mowing pattern by mowing stripes in opposite direction
  - ✓ Mow field every other day
  - ✓ Change mowing pattern for next home stand
- Irrigation
  - ✓ Complete Maintenance
  - ✓ Irrigate as needed to promote healthy turf
- Foul Lines and Coaching Box's
  - ✓ Paint areas as needed

UT Extension
PB1632



TURFGRASS SCIENCE
The University of Tennessee

THE UNIVERSITY of TENNESSEE

Bermudagrass Athletic Field Management Calendar

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Acknowledgements

The authors thank Gary Bates, Steven Garton, Wanda Russell and Jim Wills for editing this publication and Gary Dagnan for providing graphic design. Their encouragement, support and many talents are greatly appreciated.

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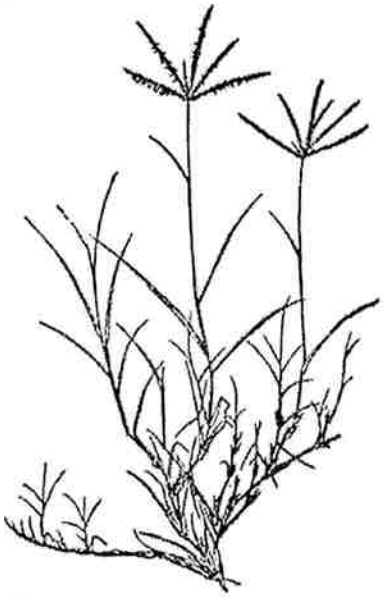
Bermudagrass Athletic Field Management Calendar

Introduction

Bermudagrasses are very aggressive, low-growing and wear-tolerant turfgrasses that provide a dense, resilient sports turf. They grow best at air temperatures from 80 to 95 F. In Tennessee, bermudagrasses are most often dormant in late fall, winter and early spring. Unless plants are severely injured during this dormancy period, they are capable of resuming growth as temperatures rise in the spring.

Bermudagrass varieties may vary in color, texture, density, vertical and lateral growth rate, low-temperature hardiness, disease resistance and method of establishment. Clonal, hybrid [e.g., interspecific cross between Common bermudagrass (*Cynodon dactylon*) and African bermudagrass (*C. transvaalensis*)] bermudagrasses do not produce viable seeds and must be established from sprigs, plugs or sod. Improved, common bermudagrasses such as Jackpot, Mirage, Pyramid, Riviera, Sundevil II and Yukon can be seeded. Quickstand and Vamont are low-temperature-tolerant, vegetatively established varieties. Because of its openness, the clonal variety Vamont is easily overseeded. The overall turf quality of Quickstand is similar to Vamont, but finer in texture. Quickstand has also demonstrated a very low incidence of spring dead spot. Although the low-temperature tolerance of Tifway (Tifton 419) is limited and winterkill tendency is quite high, this hybrid remains a popular choice for many newly constructed athletic fields. Tifway has cold hardiness superior to Tifgreen. The hybrid Tifgreen (Tifton



328) is very dense, withstands very short mowing heights and often requires intensive management. Tifsport, a dark-green, vegetatively established hybrid bermudagrass released for sod production in 1995 and adapted as far north as Stillwater, OK and Lexington, KY, is maintained on several newer athletic fields throughout the state. GN-1, a recent introduction with patents in the U. S. and Australia, is darker green and has wider leaves than Tifway. Tifton 10, a drought-resistant, high-temperature-tolerant variety was originally collected in Shanghai, China in 1974. Plants are coarse-textured and have dark bluish-green foliage. Patriot, recently released by Oklahoma State University, is another vegetatively established variety being evaluated for potential use on athletic fields in Tennessee.

Location, soils and management influence bermudagrass performance. Climatic conditions, weed competition and pest activity often vary from year to year. Management programs may be adjusted annually, based on observed results. This management calendar is intended to serve as a quick reference and guide for the monthly care of bermudagrass athletic fields in Tennessee.

Equipment Needs

Boom and hand-held (or back-pack) sprayers
Core aerifier
Drag mat
Mower (reel mower preferred)
Topdresser
Tractor (with flotation or turf tires)
Tractor-mounted rotary or pendulum spreader
Utility vehicle
Vertical mower or power rake
Walk-behind rotary and drop spreaders

An assortment of equipment is needed to maintain high-quality athletic fields. Bermudagrasses require routine mowing, irrigation and fertilization. Coring (core aerification) several times throughout the growing season helps reduce soil compaction, a primary cause of turf loss. Vertical mowing is often necessary to remove thatch. Topdressing (e.g., 1/8-inch in depth) with sand or soil will smooth and firm the soil surface. Pesticide applications may be necessary to control troublesome weeds, disease and insects.

Mowing

Mow when the turf is dry. Reel mowers most often provide the highest-quality cut. Whenever possible, return clippings to the turf. As clippings decompose, essential nutrients are again available to plants.

Height:
Mow vegetatively established hybrids at a cutting height from 3/4 to 1½ inches; 'Common' and improved, common bermudagrasses, from 1 to 1½ inches. Raise the cutting height before low temperature and drought stresses of winter.

Frequency:
Mow often, removing no more than one-third of the aerial shoots each time.

Direction:
Change the direction of mowing often to distribute wear and soil compaction.

Figure 1. A power-driven reel mower.

Mowing Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Mow				m[1]	M[1]	M	M	M	m	m		

[1] *m indicates that although mowing may be required this month, the rate of growth of bermudagrass may be slowed by low temperatures. M implies that warm temperatures may promote rapid vertical and lateral growth of bermudagrass during the month.*

Irrigation

Irrigation is required for maintaining strong, wear-resistant bermudagrass. Actively growing plants often contain more than 75 percent water by weight. An underground, automatic sprinkler system is most often preferred when irrigating heavy-use sports turf.

Amount:
Irrigate to supplement rainfall. Actively growing bermudagrasses usually require from 1 to 1½ inches (about 635 to 940 gallons of water per 1,000 square feet) of water each week.

Frequency:
Try to water no more than twice each week. Moisten soil to a 6-inch depth each time.

When to Irrigate:
Watering during early morning hours (e. g., 5:00 a.m. to 10:00 a.m.) will limit the amount of time leaf tissue remains moist and will reduce the amount of water lost to evaporation.

Irrigation Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Irrigate				I[2]	I	I	I	I	I	I		

[2] *I indicates that bermudagrass most often benefits from supplemental irrigation. Water lost to evaporation and transpiration this month most often exceeds the average total monthly rainfall received in many areas of Tennessee.*

Figure 2. An underground sprinkler system with automatic controller.

Fertilization

Thirteen of the 16 nutrients essential for the growth and survival of bermudagrass are supplied by the soil. These mineral nutrients may be classified, according to the amount required by turfgrasses, as primary, secondary or micronutrients. The primary nutrient required in greatest amounts by bermudagrasses is nitrogen (N). The potassium (K) level in bermudagrass plant tissue is second to N, and phosphorus (P) ranks third. Fertilizers containing N, P and K are often applied during the growing season to meet the plant demand for these primary nutrients. A soil test is recommended every two to three years to determine P, K and acidity levels in the soil.

In Tennessee, many soils have enough secondary (calcium, magnesium, sulfur) and micronutrients (iron, manganese, boron, copper, zinc, molybdenum and chlorine). However, periodic fertilization with one or more of these essential minerals may be necessary to maintain nutrient balance, especially when bermudagrass is growing in soils amended with sand or organic matter. Soils can be tested to determine the amounts of secondary and micronutrients available to bermudagrasses. Leaf tissue can also be analyzed to evaluate the nutritional status of plants and to identify those nutrients that may be limiting growth.

Example Fertilization Program (Using Only Quickly Available N Sources)[a]

Late February to Mid-March[b] Apply a starter fertilizer with pre-emergence herbicide [e.g., a 5-5-25 fertilizer containing 5 percent N, 5 percent available phosphate (P_2O_5) and 25 percent water-soluble potash (K_2O) with 1.73% oxadiazon[c] (Ronstar) at the rate of 175 pounds of product per acre (supplying about 2/10 pound of N and P_2O_5 and 1 pound of K_2O per 1,000 square feet)] for crabgrass and goosegrass control and to supply bermudagrass plants with N, P and K as they resume growth following winter dormancy. Water (inch) immediately after treating the turf.

Late April to Mid-May Apply a fertilizer containing a higher concentration of N than that applied in late February or March. For example, an application of 30-10-10 fertilizer at the rate of 150 pounds per acre will supply about 1 pound of N, 3/10 pound of P_2O_5 and 3/10 pound of K_2O per 1,000 square feet. Depending on the pre-emergence herbicide applied with the starter fertilizer in late February or March, the application of a fertilizer + pre-emergence herbicide combination may provide extended crabgrass and goosegrass control. Water the turf with at least inch of water immediately after fertilizing.

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[a] *This program, using fertilizer materials containing quickly available N sources only, is intended to serve as an example. Choice of fertilizers should be based on soil test results, turf quality expectations and budget. Avoid the application of excessive amounts of highly water-soluble N. Apply no more than 1 pound of quickly available N per 1,000 square feet each time. The use of extended-release N sources can minimize the potential for fertilizer "burn" and promote more consistent bermudagrass growth above and below ground.*
Ammonium nitrate (33-0-0), potassium nitrate (13-0-44) and urea (46-0-0) are examples of quickly available N sources. Sources including isobutylidene diurea (31-0-0), milorganite (6-2-0), polymer-coated urea (38-0-0), sulfur-coated urea (32-0-0) and ureaformaldehyde (38-0-0) contain slowly available N. These N sources can usually be applied less often, at higher rates compared to water-soluble, quickly available sources. A comparison of several N sources is presented in Table 1.

[b] *Due to variations in the soil surface temperature, the fertilizer + pre-emergence herbicide combination may need to be applied much earlier in West Tennessee than at higher elevations in East Tennessee.*

[c] *Several herbicides in addition to oxadiazon (Ronstar®) are labeled for the pre-emergence control of crabgrass and goosegrass in bermudagrass athletic fields. However, if bermudagrass has been severely injured during cold winter or spring months, and the athletic field must be sprigged, this pre-emergence herbicide is labeled for use when planting bermudagrass sprigs.*

Mid-June Apply 125 pounds of ammonium nitrate (33-0-0) or 100 pounds of urea (46-0-0) per acre after core aerifying. This application will supply 1 pound of quickly available N per 1,000 square feet.[d] Water (inch) immediately after fertilizing.

Mid-July Apply 125 pounds of ammonium nitrate (33-0-0) or 100 pounds of urea (46-0-0) per acre after core aerifying. This application will supply 1 pound of quickly available N per 1,000 square feet. Water (inch) immediately after fertilizing.

Mid-August Apply 125 pounds of ammonium nitrate (33-0-0) or 100 pounds of urea (46-0-0) per acre after core aerifying. This application will supply 1 pound of quickly available N per 1,000 square feet. Water (inch) immediately after fertilizing.

Mid-September Apply a fertilizer containing N, P_2O_5 and K_2O. For example, 300 pounds of 15-5-30 per acre will supply about 1 pound of N, 1/3 pound of P_2O_5 and 2 pounds of K_2O per 1,000 square feet. Potassium applied in combination with N at this time could improve the low-temperature hardiness of bermudagrasses. Water (inch) immediately after fertilizing. This will be the final fertilization for this calendar year.

Figure 3. A tractor-mounted, broadcast spreader used to fertilize bermudagrass.

[d] If soils test low in P and K, a fertilizer containing N, P_2O_5 and K_2O may be substituted for ammonium nitrate or urea. For example, 30-10-10 fertilizer broadcast at a rate of 150 pounds per acre will supply about 1 pound of N, 3/10 pound of P_2O_5 and 3/10 pound of K_2O per 1,000 square feet. When soil test results indicate that P or K is in the very high range, further applications of the nutrient testing very high should be omitted. If grass clippings are collected and removed, the amount of K applied annually should be increased [for example, apply an additional 2 pounds K_2O per 1,000 square feet (about 88 pounds K_2O per acre) each year] to compensate for the amount of K lost.

Table 1. A Comparison of Several N Sources

Nitrogen Source	~ Content (%)[a]			Salt Index per Unit[b]	Cold-Water Solubility[c] (lbs. / gal.)	Comments
	N	P_2O_5	K_2O			
Fast-Release						
Ammonium nitrate	33	0	0	3.2 H	14.5	Contains both ammonium ions that are adsorbed by soil colloids and nitrate ions, that may be mobile in soils
Ammonium sulfate	21	0	0	3.3 H	5.7	Contains 24 percent sulfur and has the greatest acidifying effect of materials listed
Calcium nitrate	15	0	0	---	---	Contains 19 percent calcium in addition to nitrogen; absorbs moisture very rapidly
Diammonium phosphate	18	46	0	1.7 M	3.4	Provides both nitrogen and phosphorus; very soluble phosphate source
Monoammonium phosphate	11	48	0	2.7 H	1.9	Although less soluble than DAP, MAP has a greater salt index per unit
Potassium nitrate	13	0	44	5.3 H	1.0	May slightly increase soil pH as it rapidly releases nitrogen
Urea	45	0	0	1.7 M	6.2	This highly water-soluble nitrogen source contains the highest nitrogen concentration of any granular fertilizer
Extended Release						
IBDU (isobutylidene diurea)	31	0	0	0.2 L	SS	Contains two molecules of urea linked by a carbon group; nitrogen release is dependent on soil moisture (hydrolysis)
Milorganite	6	4	0	0.7 L	SS	Nitrogen in this activated sewage sludge is released by microbial activity
PCU [polymer (plastic) - coated urea]	38	0	0	---	SR	Soil moisture (osmosis) is required for nitrogen release
SCU (sulfur-coated urea)	32	0	0	0.7 L	SR	The permeable sulfur (molten) coating allows water to slowly move through the barrier, dissolving the enclosed urea; nitrogen release is dependent on microbial activity and soil moisture (hydrolysis)
UF (urea formaldehyde or methylene ureas)	38	0	0	0.3L	SS	Nitrogen is released from the various-size, 'chain-like' polymers of urea as a result of soil microorganism activity

[a] *To calculate the phosphorus content (percent) of each fertilizer, multiply percent P_2O_5 by 0.44; and to calculate the potassium content (percent), multiply percent K_2O by 0.83.*

[b] *Partial salt index expressed as the relative salinity of mineral salts per unit of nutrient compared to sodium nitrate (6.3). High = 2.6 or greater; moderate = 1.0 to 2.5; and low = less than 1.0.*

[c] *SS = slowly soluble and SR = slow release.*

Table 2. Some Common Sources of Phosphorus and Potassium in Turfgrass Fertilizers

Source	Approximate Content (%)			Salt Index per Unit[c]	Cold-Water Solubility (lbs. / gal.)	Comments
	N	P_2O_5[a]	K_2O[b]			
Diammonium phosphate	18	46	0	1.7 M	3.4	Very soluble phosphate source
Monoammonium phosphate	11	48	0	2.7 H	1.9	Although less soluble than DAP, MAP has a greater salt index per unit
Muriate of potash	0	0	60	1.9 M	2.8	Very commonly used source of potassium
Potassium magnesium sulfate	0	0	22	---	---	Contains about 18 percent magnesium and 23 percent sulfur in addition to potassium; releases nutrients rapidly
Potassium nitrate	13	0	44	5.3 H	1.0	May neutralize some soil acids as it rapidly releases nitrogen
Sulfate of potash	0	0	50	0.9 L	0.9	Has a lower foliar burn potential than muriate of potash and contains 18 percent sulfur
Superphosphate	0	20	0	0.4 L	0.2	Decreases soil acidity; contains calcium and sulfur in the gypsum ($CaSO_4$) component that acts as a drying agent
Treble superphosphate	0	44	0	0.2 L	0.3	Concentrated source of phosphorus

[a] *To calculate the phosphorus content (percent) of each fertilizer, multiply percent P_2O_5 by 0.44.*
[b] *To calculate the potassium content (percent), multiply percent K_2O by 0.83.*
[c] *Expressed as the relative salinity of mineral salts per unit of nutrient compared to sodium nitrate (6.3). High = 2.6 or greater; moderate = 1.0 to 2.5; and low = less than 1.0.*

Table 3. Some Common Sources of Calcium, Magnesium and Sulfur in Turfgrass Fertilizers

Source	Approximate Calcium Content (%)	Approximate Magnesium Content (%)	Approximate Sulfur Content (%)
Ammonium sulfate	0	0	24
Agricultural limestone (calcium carbonate)	32	0	0
Calcium hydroxide	46	1	0
Calcium metaphosphate	19	0	0
Calcium nitrate	19	2	0
Calcium oxide	52	0	0
Dolomitic limestone	22	11	0
Ferrous ammonium sulfate	0	0	16
Ferrous sulfate	0	0	18
Gypsum	22	0	19
Magnesium carbonate (magnesite)	0	28	0
Magnesium hydroxide	0	40	0
Magnesium oxide	0	55	0
Epsom salt (magnesium sulfate)	0	10	14
Potassium magnesium sulfate	0	11	22
Potassium sulfate	0	0	17
Sulfur, elemental	0	0	99
Superphosphate	21	0	12

Table 4. Some Common Sources of Micronutrients Applied to Turfgrasses

Micronutrient	Source	Approximate Content
Boron	Borax	11% boron
	Boric acid	17% boron
	Solubor	20% boron
Chlorine	Potassium chloride	47% chlorine
Copper	Copper chelate[a]	6 to 13% copper
	Copper oxide	75% copper
	Copper sulfate, pentahydrate	25% copper
Iron	Ferric oxide	69% iron
	Ferric sulfate	23% iron
	Ferrous ammonium sulfate	14% iron
	Ferrous oxide	77% iron
	Iron ammonium polyphosphate	22% iron
	Iron (ferrous) sulfate	20% iron
	Iron chelate[a]	5 to 14% iron
Manganese	Manganese carbonate	31% manganese
	Manganese chelate[a]	12% manganese
	Manganese chloride	17% manganese
	Manganese methoxyphenylpropane	10 to 12% manganese
	Manganese oxide	63% manganese
	Manganese sulfate	26 to 28% manganese
	Manganous oxide	41 to 68% manganese
Molybdenum	Ammonium molybdate	49% molybdenum
	Sodium molybdate	39% molybdenum
Zinc	Basic zinc sulfate	55% zinc
	Zinc carbonate	52% zinc
	Zinc chelate[a]	14% zinc
	Zinc oxide	78% zinc
	Zinc phosphate	51% zinc
	Zinc sulfate monohydrate	35% zinc
	Zinc sulfate heptahydrate	23% zinc

[a] *Micronutrients can be combined with organic compounds to produce more stable or 'chelated' carriers. Chelated micronutrient carriers usually have a longer residual response in soils and are less prone to loss by leaching than other highly water-soluble carriers.*

Fertilization Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Fertilize		Fh_1[3]	Fh_1	Fh_2[4]	Fh_2	F[5]	F	F	F			

[3] *Fh_1 indicates that a fertilizer + pre-emergence herbicide combination is recommended from late February to mid-March to control summer annual weed grasses including crabgrasses and goosegrass while fertilizing bermudagrass. For example, oxadiazon (Ronstar®) will control crabgrasses and goosegrass before seedlings emerge from the soil and will not harm newly sprigged bermudagrass.*

[4] *Fh_2 indicates that fertilization will promote the growth of bermudagrass this month and, depending on the pre-emergence herbicide applied with the starter fertilizer in late February or March, a pre-emergence herbicide applied with fertilizer in late April or May could extend the crabgrass and goosegrass control period.*

[5] *F indicates that fertilization will promote the growth of bermudagrass this month.*

Liming

Apply ground or pelletized limestone according to soil test results. If the acid content of the soil is low (e.g., soil pH from 6.0 to 7.0), liming is not recommended. Agricultural or ground limestone is available in either calcitic or dolomitic forms and is commonly used to neutralize soil acids. Calcitic limestone contains mostly calcium carbonate and supplies calcium to bermudagrass. Dolomitic limestone contains both calcium and magnesium. Some companies market agricultural limestone that has been compressed into pellet form for ease of spreading. Pelletized limestone is often much easier to apply than pulverized limestone. Rainfall or irrigation immediately after liming will help disperse the pellets.

When to Apply:
Limestone can be applied to bermudagrass athletic fields almost any time of year. For maintenance applications, do not broadcast more than 2,000 pounds of agricultural or pelletized-agricultural limestone per acre (about 50 pounds per 1,000 square feet) per application.

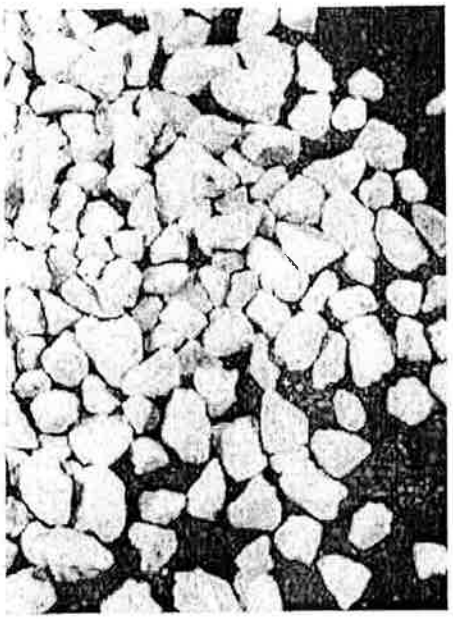

Figure 4. Pelletized dolomitic limestone.

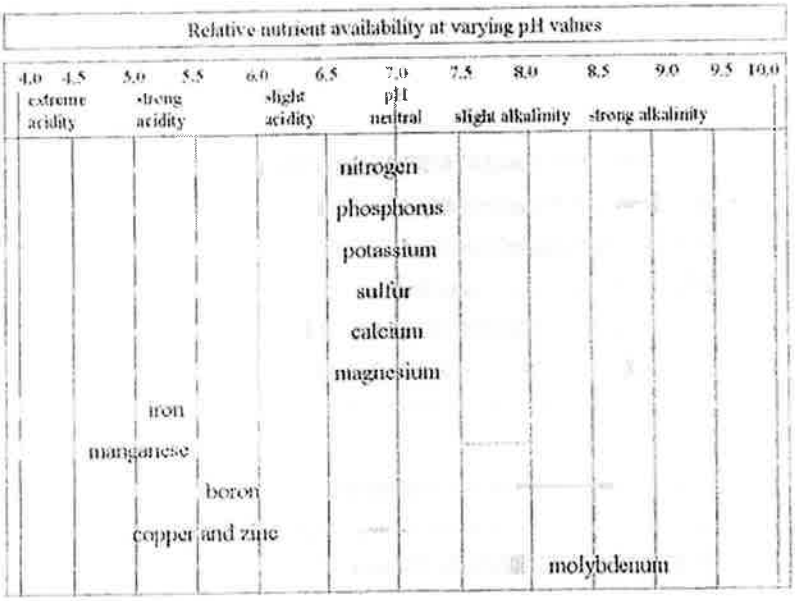

Figure 5. The influence of soil pH on nutrient availability.

For more detailed information, please refer to Extension **PB1096, Liming Acid Soils in Tennessee**.

Coring

Soil compaction is a major cause of bermudagrass loss on many athletic fields throughout Tennessee each year. In addition to relieving soil compaction, coring will improve the movement of water through thatch and into the soil. Fertilizing immediately after coring will help speed the movement of nutrients into the bermudagrass root zone. For best results when using a rotary-motion core aerifier, aerify several times across the turf and in several directions. Use a drag-mat or water the turf to break up the soil cores lying on the turf surface after coring.

Core compacted soils often during the bermudagrass growing season. In addition to relieving soil compaction, monthly coring from May to August will speed water infiltration and bermudagrass recovery.

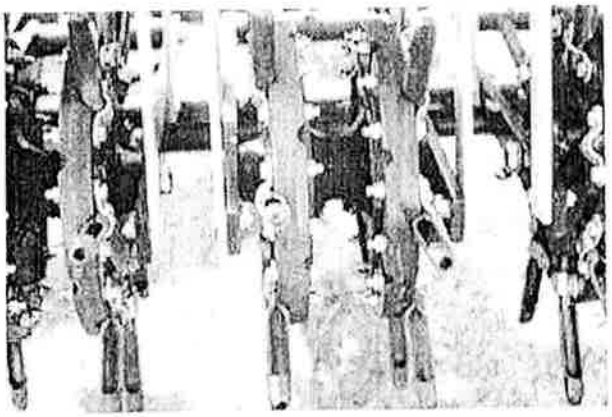

Figure 6. A rotary-motion, hollow-tine core aerifier.

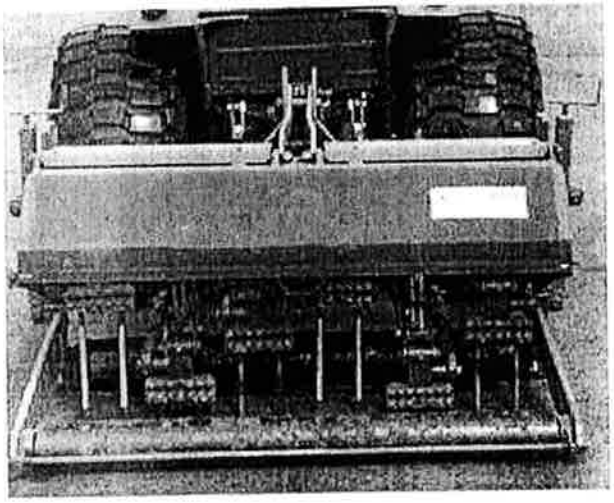

Figure 7. A deep-tine core aerifier.

Coring Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Coring					C[6]	C	C	C				

[6] *C indicates that bermudagrass may benefit from coring during the month.*

Topdressing

Topdressing, the application of a uniform layer of soil or sand to athletic fields, will help smooth the soil surface and build up low areas that may develop. Medium-textured sands and soils similar to the existing soil base may be used as topdressing materials. Topdressing to create a 1/4-inch thick layer is often especially effective immediately following core aerification. A drag mat may be used after topdressing to thoroughly mix topdressing materials and the soil from aeration cores with thatch.

Light applications (e. g., 1/8- to 1/4-inch deep) of topdressing materials can be made throughout the bermudagrass growing season.

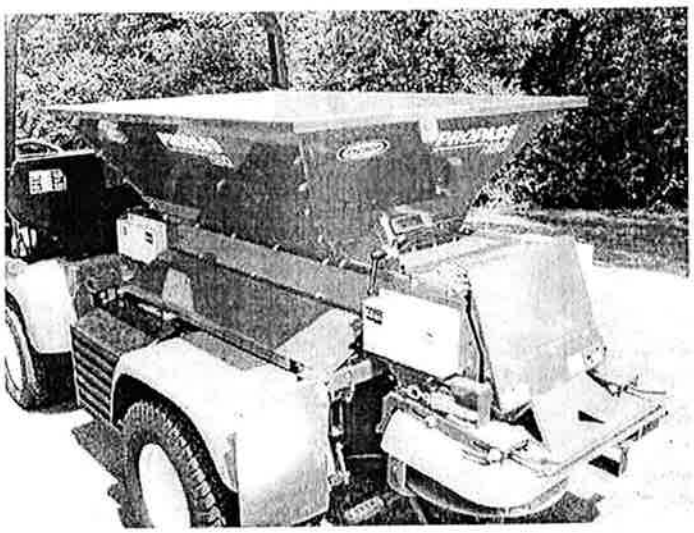

Figure 8. A topdressing machine used to broadcast a thin, uniform layer of sand or soil over bermudagrass.

Table 5. The Volume of Material Required to Topdress Athletic Fields or Amend Soils

Amounts of topdressing or soil amendment needed:
1/8 inch in depth requires about 0.4 cubic yards per 1,000 square feet
1/4 inch in depth requires about 0.8 cubic yards per 1,000 square feet
1 inch in depth requires about 3.2 cubic yards per 1,000 square feet
6 inches in depth requires about 19.2 cubic yards per 1,000 square feet

Table 6. The Approximate Weight of Selected Materials

Material	Approximate Weight (Lbs./Cubic Yard)
Loam - Loose	2,200
Loam - Compact	2,550
Clay - Compact	2,700
Clay - Wet	3,050
Clay + Sand - Compact	3,250
Silty Sand - Wet	3,100
Sand - Dry	2,700
Peat Moss - Compact	450
Peat Moss - Loose	110

Topdressing Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Topdressing					T[7]	T	T	T				

[7] *T indicates that bermudagrass athletic fields are commonly topdressed during the month.*

Dethatching

Dethatch bermudagrass when the thatch layer reaches a depth of ½ inch or more. Dethatch in March, before bermudagrass resumes growth and pre-emergence herbicide is applied, or in the summer, when plants are growing rapidly and will recover quickly.

Bermudagrass produces new plant parts, sloughing off old leaves, stems and roots. A thatch layer forms when plants are growing rapidly and the rate of accumulation of old plant materials exceeds their rate of decay. Excessive thatch causes several problems. The entwined layer of undecomposed and partially decomposed roots, stems, leaves and grass clippings may restrict the movement of water, air and nutrients into the soil. Thatch provides an excellent environment for insect pests and fungal pathogens. Young bermudagrass plants rooted within the thatch layer are often susceptible to drought. Temperature fluctuations in the thatch layer are more extreme than those in the soil below.

Excessive nitrogen fertilization, scalping and prolonged drought favor an accumulation of thatch. Mechanical dethatching is recommended when a -inch layer of thatch forms. Power rakes and vertical mowers are engineered for thatch removal. Machines for mechanically removing thatch from the soil surface often have blades, knives or tines mounted on a reel that revolves on a vertical plane. They are most effective when set to penetrate the thatch layer, lightly striking the soil below. A power sweeper is very useful when removing the loosened organic material. The rate of recovery of bermudagrass after dethatching varies with the climatic conditions, soil fertility level and method of thatch removal.

Figure 9. A vertical mower used to remove thatch from bermudagrass.

Dethatching Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Dethatching			D[a]			D	D					

[a] *D indicates that, if necessary, bermudagrass may be dethatched during the month. Thatch removal in March, while bermudagrass is dormant, may help speed spring green-up. Actively growing plants often recover quickly following dethatching in June or July. Dethatching is not generally recommended in August if a temporary reduction in turfgrass shear strength is unacceptable and the athletic field will receive heavy use in late summer and early fall.*

Winter Protection

A uniform layer of straw, at a rate of about three tons per acre, will help insulate bermudagrass and conserve moisture during the winter dormancy period. Rake the straw off the turf surface when the threat of extended periods of freezing temperatures has passed. Although wheat and oat seeds in straw may germinate, seedlings of these cereal grains do not usually tolerate repeated mowing at a 3/4 to 1 inch height of cut. During late spring and summer, bermudagrass competes with wheat and oat seedlings for available moisture, light and nutrients. Although some of the straw may deteriorate over winter, it may be possible to rake much of it from the turf surface and bale it for use the next year.

Winter protective covers (synthetic blankets) often vary in color, thickness, light interception, weight, insulation value and cost. Several help buffer bermudagrass from low-temperature extremes while allowing water and some light to pass through.

Figure 10. Straw protecting a dormant bermudagrass football field from winter injury.

Table 7. The Effects of Soil Temperature on Bermudagrasses

Soil Temperature (F)	Plant Response
80 to 95	Optimum growth of aerial shoots
65 to 79	Reduction in the growth rate of aerial shoots
55 to 64	Plant hardening
50 to 54	Chilling temperatures damage leaves
32 to 49	Dormancy
20 to 31	Roots and aerial shoots are often severely injured and may die; nodes often live
Less than 20	Total low-temperature kill

Winter Protection Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Broadcast Straw for Winter Protection											St[9]	St
Remove Straw			St_r[10]									

[9] *St = Broadcast straw or install a winter protective cover in late November or early December to protect dormant bermudagrass from low-temperature extremes during winter.*

[10] *St_r = Remove straw or winter protection cover when the threat of extended periods of freezing temperatures is low (for example, from early to mid-March).*

Predicting the Probability of a Freeze

Freeze probabilities have been developed based on weather data recorded at 43 sites across Tennessee from 1921 through 1950. Air temperature recorded at each location was measured by thermometer about 4 feet above ground in a weather instrument shelter. This information may be particularly helpful when scheduling bermudagrass maintenance practices in spring and fall.

Figure 11. Frost pattern on bermudagrass.

Table 8. The Probability of Freezing Temperatures (32 F) On or After Indicated Dates

Station	Probability[a] (%) - Spring				
	90	75	50	25	10
Ashwood	Mar. 26[b]	Apr. 1	Apr. 8	Apr. 15	Apr. 21
Bolivar	Mar. 12	Mar. 22	Apr. 3	Apr. 15	Apr. 25
Bristol	Apr. 2	Apr. 8	Apr. 16	Apr. 24	May 1
Brownsville	Mar. 11	Mar. 19	Mar. 28	Apr. 5	Apr. 13
Carthage	Mar. 20	Mar. 29	Apr. 7	Apr. 16	Apr. 25
Chattanooga WB Airport	Mar. 9	Mar. 17	Mar. 26	Apr. 4	Apr. 12
Clarksville	Mar. 19	Mar. 27	Apr. 4	Apr. 12	Apr. 20
Coldwater	Mar. 27	Apr. 3	Apr. 11	Apr. 19	Apr. 26
Copperhill	Mar. 28	Apr. 4	Apr. 11	Apr. 18	Apr. 24
Covington	Mar. 10	Mar. 18	Mar. 27	Apr. 4	Apr. 12
Crossville	Apr. 5	Apr. 13	Apr. 21	Apr. 29	May 7
Dale Hollow Dam	Mar. 31	Apr. 6	Apr. 13	Apr. 20	Apr. 26
Decatur	Mar. 31	Apr. 6	Apr. 14	Apr. 22	Apr. 30
Dickson	Mar. 25	Apr. 1	Apr. 10	Apr. 18	Apr. 26
Dover	Mar. 29	Apr. 6	Apr. 15	Apr. 24	May 2
Franklin	Mar. 27	Apr. 4	Apr. 12	Apr. 20	Apr. 28
Gatlinburg	Apr. 14	Apr. 21	Apr. 29	May 7	May 14
Greeneville Exp. Sta.	Apr. 5	Apr. 12	Apr. 20	Apr. 28	May 5
Jackson Exp. Sta.	Mar. 22	Mar. 29	Apr. 6	Apr. 14	Apr. 21
Kenton	Mar. 15	Mar. 23	Apr. 1	Apr. 10	Apr. 18
Knoxville WB Airport	Mar. 14	Mar. 22	Mar. 31	Apr. 9	Apr. 17
Lewisburg	Mar. 31	Apr. 6	Apr. 14	Apr. 22	Apr. 29
Loudon	Mar. 21	Mar. 31	Apr. 10	Apr. 20	Apr. 30
Lynnville	Mar. 26	Apr. 3	Apr. 13	Apr. 23	May 1
McMinnville	Mar. 21	Mar. 29	Apr. 8	Apr. 18	Apr. 26
Memphis WB Airport	Mar. 1	Mar. 10	Mar. 20	Mar. 30	Apr. 8
Milan	Mar. 16	Mar. 25	Apr. 4	Apr. 14	Apr. 23
Moscow	Mar. 18	Mar. 25	Apr. 2	Apr. 10	Apr. 17
Murfreesboro	Mar. 20	Mar. 28	Apr. 5	Apr. 13	Apr. 21
Nashville WB Airport	Mar. 12	Mar. 19	Mar. 28	Apr. 6	Apr. 13
Newbern	Mar. 11	Mar. 18	Mar. 27	Apr. 5	Apr. 12
Newport	Mar. 28	Apr. 4	Apr. 11	Apr. 18	Apr. 25
Norris Dam	Apr. 3	Apr. 9	Apr. 16	Apr. 23	Apr. 29
Palmetto	Mar. 27	Apr. 3	Apr. 10	Apr. 17	Apr. 24
Paris	Mar. 27	Apr. 3	Apr. 12	Apr. 21	Apr. 28
Rogersville	Apr. 4	Apr. 10	Apr. 17	Apr. 24	Apr. 30
Rugby	Apr. 17	Apr. 24	May 3	May 12	May 20
Samburg Wildlife Rfg.	Mar. 11	Mar. 20	Mar. 29	Apr. 7	Apr. 16
Savanaah	Mar. 17	Mar. 26	Apr. 4	Apr. 13	Apr. 22
Springfield Exp. Sta.	Mar. 24	Mar. 31	Apr. 7	Apr. 14	Apr. 21
Tullahoma	Mar. 26	Apr. 2	Apr. 10	Apr. 18	Apr. 25
Union City	Mar. 15	Mar. 22	Mar. 31	Apr.. 9	Apr.. 16
Waynesboro	Apr.. 1	Apr.. 9	Apr.. 18	Apr.. 27	May 5

[a] *Probabilities are intended to describe average conditions across the state.*

[b] *The listed probability of a spring freeze (32 F) occurring at Ashwood on or after March 26 is 90 percent (e.g., the odds of a spring freeze on or after March 26 are 9 to 1).*

Table 9. The Probability of Freezing Temperatures (32 F) On or Before Indicated Dates

Station	Probability[a] (%) - Fall				
	10	25	50	75	90
Ashwood	Oct. 9	Oct. 16	Oct. 24[b]	Nov. 1	Nov. 8
Bolivar	Oct. 6	Oct. 14	Oct. 23	Nov. 1	Nov. 9
Bristol	Oct. 8	Oct. 15	Oct. 23	Oct. 31	Nov. 7
Brownsville	Oct. 18	Oct. 24	Oct. 31	Nov. 7	Nov. 13
Carthage	Oct. 13	Oct. 20	Oct. 28	Nov. 5	Nov. 12
Chattanooga WB Airport	Oct. 27	Nov. 2	Nov. 9	Nov. 17	Nov. 25
Clarksville	Oct. 17	Oct. 23	Oct. 29	Nov. 4	Nov. 9
Coldwater	Oct. 6	Oct. 13	Oct. 21	Oct. 29	Nov. 6
Copperhill	Oct. 9	Oct. 16	Oct. 23	Oct. 30	Nov. 6
Covington	Oct. 23	Oct. 28	Nov. 3	Nov. 9	Nov. 14
Crossville	Sept. 26	Oct. 4	Oct. 14	Oct. 24	Nov. 1
Dale Hollow Dam	Oct. 4	Oct. 12	Oct. 21	Oct. 30	Nov. 7
Decatur	Oct. 11	Oct. 17	Oct. 24	Oct. 31	Nov. 6
Dickson	Oct. 8	Oct. 15	Oct. 23	Oct. 31	Nov. 7
Dover	Oct. 4	Oct. 11	Oct. 19	Oct. 27	Nov. 3
Franklin	Oct. 5	Oct. 13	Oct. 21	Oct. 29	Nov. 6
Gatlinburg	Oct. 1	Oct. 8	Oct. 16	Oct. 24	Oct. 31
Greeneville Exp. Sta.	Oct. 1	Oct. 8	Oct. 17	Oct. 26	Nov. 2
Jackson Exp. Sta.	Oct. 9	Oct. 16	Oct. 23	Oct. 30	Nov. 6
Kenton	Oct. 8	Oct. 16	Oct. 24	Nov. 1	Nov. 9
Knoxville WB Airport	Oct. 24	Oct. 30	Nov. 6	Nov. 13	Nov. 19
Lewisburg	Oct. 4	Oct. 12	Oct. 20	Oct. 28	Nov. 5
Loudon	Oct. 8	Oct. 16	Oct. 24	Nov. 1	Nov. 9
Lynnville	Oct. 5	Oct. 12	Oct. 20	Oct. 28	Nov. 4
McMinnville	Oct. 12	Oct. 20	Oct. 28	Nov. 5	Nov. 13
Memphis WB Airport	Oct. 26	Nov. 3	Nov. 12	Nov. 21	Nov. 29
Milan	Oct. 11	Oct. 18	Oct. 26	Nov. 3	Nov. 10
Moscow	Oct. 8	Oct. 16	Oct. 24	Nov. 1	Nov. 9
Murfreesboro	Oct. 10	Oct. 17	Oct. 25	Nov. 2	Nov. 9
Nashville WB Airport	Oct. 27	Nov. 1	Nov. 7	Nov. 13	Nov. 18
Newbern	Oct. 15	Oct. 22	Oct. 31	Nov. 9	Nov. 16
Newport	Oct. 9	Oct. 16	Oct. 24	Nov. 1	Nov. 8
Norris Dam	Oct. 12	Oct. 19	Oct. 27	Nov. 4	Nov. 11
Palmetto	Oct. 6	Oct. 14	Oct. 24	Nov. 3	Nov. 11
Paris	Oct. 19	Oct. 25	Oct. 31	Nov. 6	Nov. 12
Rogersville	Oct. 8	Oct. 16	Oct. 24	Nov. 1	Nov. 9
Rugby	Sept. 26	Oct. 2	Oct. 8	Oct. 14	Oct. 20
Samburg Wildlife Rfg.	Oct. 20	Oct. 26	Nov. 2	Nov. 9	Nov. 15
Savanaah	Oct. 11	Oct. 19	Oct. 28	Nov. 6	Nov. 14
Springfield Exp. Sta.	Oct. 18	Oct. 24	Oct. 30	Nov. 5	Nov. 11
Tullahoma	Oct. 10	Oct. 16	Oct. 23	Oct. 30	Nov. 5
Union City	Oct. 16	Oct. 22	Oct. 28	Nov. 3	Nov. 9
Waynesboro	Oct. 1	Oct. 8	Oct. 15	Oct. 22	Oct. 29

[a] *Probabilities are intended to describe average conditions across the state.*

[b] *The listed probability of a fall freeze (32 F) occurring in Ashwood on or before October 24 is 50 percent (e.g., the odds of a fall freeze on or before October 24 are 1 to 1).*

Providing Fall and Spring Color

Perennial ryegrass can be seeded (overseeded) in late summer or early fall into established bermudagrass for color and improved winter playability. New, disease-resistant perennial ryegrass varieties and seed blends (two or more varieties of perennial ryegrass) are most often preferred. Annual ryegrass has very poor low-temperature hardiness and may lose stand density in the spring, creating a non-uniform turf surface. A typical perennial ryegrass overseeding rate is from 10 to 15 pounds of seed per 1,000 square feet. By decreasing the mowing height, collecting clippings, dethatching and dragging the bermudagrass with a drag mat before seeding, more ryegrass seeds should contact soil. The competition of perennial ryegrass plants for water, nutrients and light often lowers the density and overall quality of bermudagrass the following spring. Several green pigments and dyes are also available to color dormant bermudagrass. Although pigments are often more expensive than dyes, they usually provide color for a much longer period of time.

Perennial Ryegrass Overseeding Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Overseeding Established Bermudagrass with Perennial Ryegrass									PR[1]			

[1] *PR indicates that bermudagrass can be overseeded with perennial ryegrass this month to provide color during the winter dormancy period.*

Removing Perennial Ryegrass

Rising temperatures, N fertilization, dethatching and frequent mowing during late spring and summer usually favor the growth and recovery of bermudagrass. Perennial ryegrasses often experience high-temperature stress and are disease-prone (e.g., cottony blight, and Bipolaris, Drechslera and Rhizoctonia diseases) during hot weather, when bermudagrasses are growing rapidly. The herbicides foramsulfuron (Revolver), trifloxysulfuron (Monument) and rimsulfuron (TranXit) are labeled for the selective removal of perennial ryegrass plants from established (at least 1-year-old) bermudagrass turf. Optimum timing for removal of perennial ryegrass overseeding is May 1 to June 15. These herbicides will control perennial ryegrass in 17 to 24 days following application, depending on temperature and moisture conditions. In addition, these herbicides can also be applied from seven to 21 days prior to overseeding bermudagrass with perennial ryegrass to control early-germinating annual bluegrass. See label recommendations for specific rate and timing.

Weeds and Their Control

The best weed control is a healthy, dense, actively growing turf. The presence of many weeds in bermudagrass usually indicates the need to adjust the overall management program.

Turfgrass weeds may produce many seeds, bulbs and above- or below-ground stems from which new plants establish. Weed seeds are transported by wind, water and animals. Wash the mower often. Stems, bulbs and seeds are easily transported by machinery and spread to other non-infested areas. Topdressing materials and straw used to smooth and mulch the soil surface, respectively, may contain weed seeds, bulbs, stolons and rhizomes.

An important first step in developing a successful weed management program is the identification of troublesome weed(s). Next, determine the extent of the problem. Are plants uniformly distributed throughout the turf or located in a limited number of zones? Are weeds competing with actively growing bermudagrass plants for available nutrients, water, light and space or merely reducing the turf s beauty? Can the competitiveness of bermudagrass be improved by mowing, fertilizing, watering, aerifying or dethatching or is a herbicide application necessary? If herbicide treatment is required, determine the stage of growth at which the target weed is most vulnerable and respond accordingly.

Turfgrass weeds are divided into two major groups: weed grasses and broadleaf weeds. Weed grasses (e.g., crabgrasses, goosegrass, ...) emerge from seed with a single seedling leaf. They have leaves with parallel veins. Broadleaf weeds (e.g., white clover, dandelion, ...) emerge from seed with two seedling leaves. The veins of leaves of broadleaf weeds form a network-like pattern. Turfgrass weeds may be annuals, biennials or perennials and are further subdivided by their season of growth.

Summer Annual Weed Grasses

Each year, smooth crabgrass, large crabgrass, goosegrass and foxtails germinate from seed and may compete with bermudagrass for available moisture, nutrients and light. These aggressive summer annual weed grasses begin emerging from seed in the spring, grow very fast during summer months and complete their life cycle or die by late fall.

Winter Annual Weed Grasses

Seeds of winter annual weed grasses (e.g., annual bluegrass and annual ryegrass) germinate in late summer, fall and winter. These weeds usually complete their life cycle in the spring.

Summer Annual Broadleaf Weeds

Lespedeza, prostrate spurge and prostrate knotweed are examples of low-growing, summer annual broadleaf weeds that begin emerging from seed in the spring and invade bermudagrass during summer months.

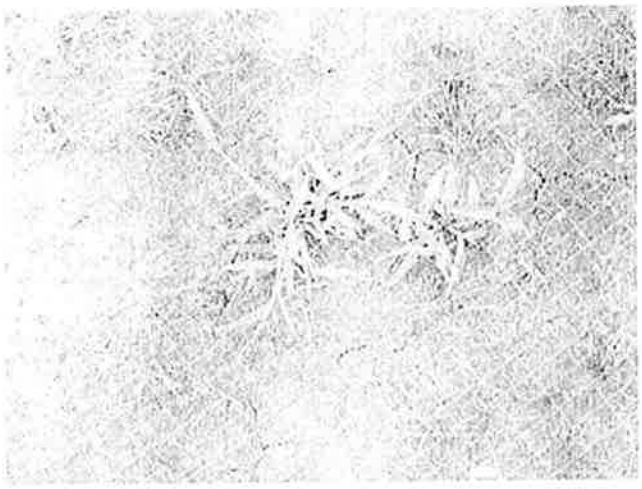

Figure 12. Crabgrass.

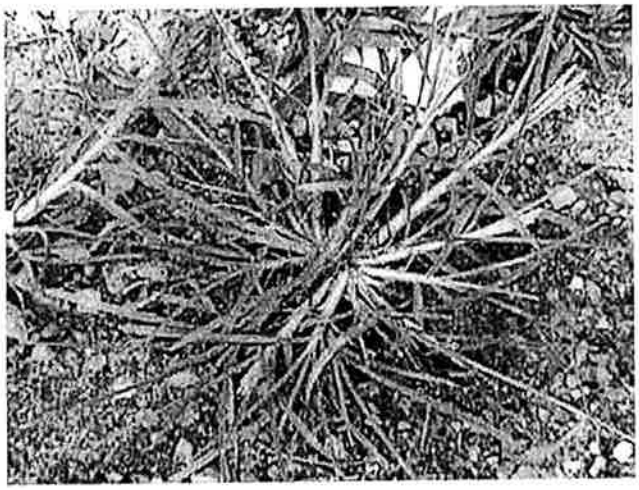

Figure 13. Goosegrass.

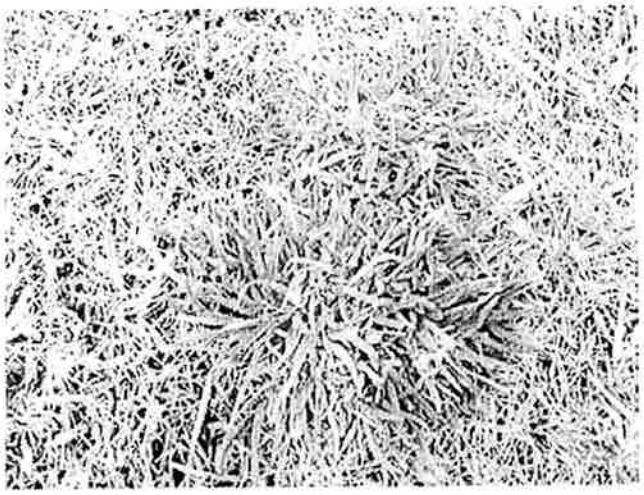

Figure 14. Annual Bluegrass.

Figure 15. Prostrate Knotweed.

Winter Annual Broadleaf Weeds

Common chickweed, purple deadnettle, henbit and speedwell are frequently observed growing in dormant bermudagrass. These winter annual broadleaf weeds complete their life cycle or die as air temperature increases in the spring.

Perennial Weeds

Perennial weed grasses and broadleaf weeds live for more than two years. Dallisgrass, nimblewill and orchardgrass are difficult-to-control perennial weed grasses. Mouse-ear chickweed, white clover, Virginia buttonweed and ground ivy are creeping perennials. Dandelion, broadleaf plantain, buckhorn plantain and curly dock are perennial broadleaf weeds that do not form creeping, above- or below-ground stems. Wild garlic and wild onion, found throughout Tennessee, reproduce by bulbs and seeds.

Indicator Weeds

Some weeds are very competitive when soil and climatic conditions are less than ideal for bermudagrass growth. The presence of annual bluegrass, annual lespedeza, broadleaf plantain, corn speedwell, goosegrass, prostrate knotweed or prostrate spurge often signals that the soil is compacted. Black medic and clover may indicate low or deficient levels of nitrogen. Annual lespedeza, goosegrass, prostrate knotweed, prostrate spurge and yellow woodsorrel are often problems on drought-prone sites. Algae, annual bluegrass, moss and rushes often thrive in excessively wet soils.

Selecting a Herbicide

An effective athletic field maintenance program can result in fewer herbicide applications. If a herbicide is necessary to suppress or control a weed problem, choose, purchase and apply an appropriate product very carefully. Some herbicides are applied just before weeds are expected to appear. These pre-emergence herbicides often reduce the need to apply post-emergence (to actively growing weeds) herbicides. Post-emergence herbicides are usually most effective when applied as foliar sprays to young, actively growing, emerged weeds.

Controlling Crabgrasses and Goosegrass

Pre-emergence

Crabgrass seeds usually begin to germinate shortly after forsythia blooms. Generally, goosegrass seeds begin to germinate about one month after crabgrasses. Apply an appropriate pre-emergence herbicide at the recommended (label) rate in the spring when daytime temperatures reach 65 F for four or more days. Examples of preemergence herbicides are: benefin (Balan), benefin + oryzalin (XL), benefin + trifluralin (Team), bensulide (Bensumec), bensulide + oxadiazon (Scott s Goose-

Figure 16. Henbit.

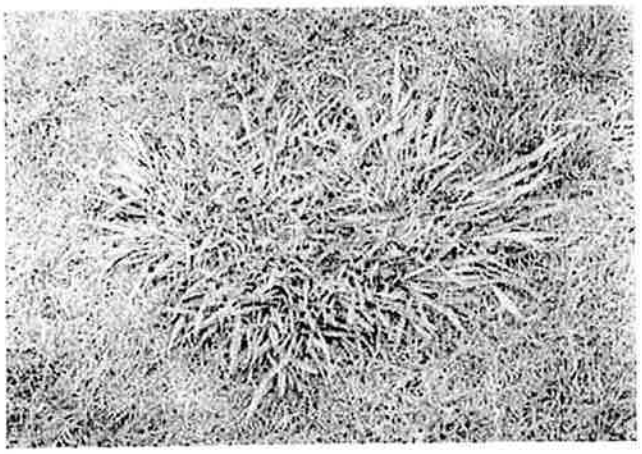

Figure 17. Dallisgrass.

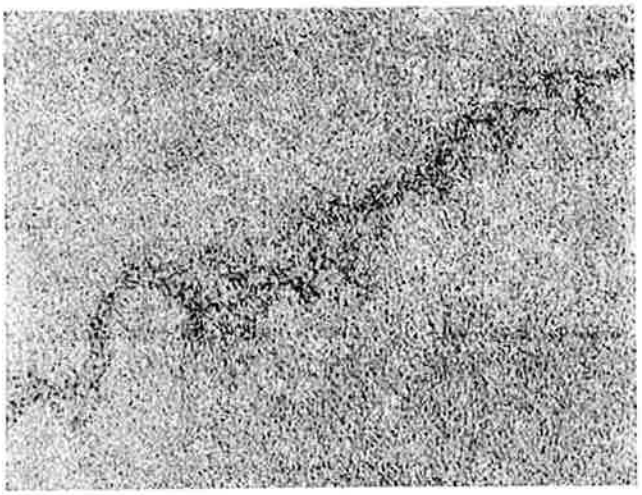

Figure 18. Algae.

grass/Crabgrass Control), dithiopyr (Dimension), metolachlor (Pennant), oryzalin (Surflan), oxadiazon (Ronstar), pendimethalin (Pendulum) and prodiamine (Barricade)]. Other combinations and formulations of these herbicides exist. The level of control often drops if pre-emergence herbicides are not activated by watering (inch) or rainfall within about seven days after treatment.

Pre-emergence Crabgrasses/Goosegrass Control Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Pre-emergence Crabgrasses/ Goosegrass Control		H_{pr1} CG[12]	H_{pr1} CG	H_{pr2} CG[13]	H_{pr2} CG							

[12] *H_{pr1}CG indicates that, if necessary, a herbicide or granular fertilizer + herbicide combination may be applied from late February to mid-March for pre-emergence control of crabgrasses and goosegrass. For example, a pre-emergence herbicide + starter fertilizer (containing P, K and very little N) combination will control crabgrasses and goosegrass as weed seeds germinate while supplying bermudagrass with the essential primary nutrients.*
[13] *Depending on the pre-emergence herbicide or pre-emergence herbicide + starter fertilizer combination applied in late February or March, a second pre-emergence herbicide application from late April to mid-May could extend the crabgrass and goosegrass control period. The pre-emergence herbicide could be applied in combination with a fertilizer.*

Post-emergence

Several products [e.g., disodium methanearsonate (DSMA), metribuzin (Sencor for application by commercial turfgrass applicators) and monosodium methane arsonate (MSMA)] are labeled for the control of emerged crabgrasses and goosegrass in bermudagrass. For example, MSMA may effectively control young crabgrass and goosegrass plants when applied at a rate of 2 pounds active ingredient per acre when the air temperature reaches 80 degrees F and soils are moist. For example, 1/3 gallon (42 2/3 ounces) of a product containing 6 pounds active ingredient (MSMA) per gallon applied per acre is the equivalent of 2 pounds active ingredient per acre. A second application may be necessary for best control of heavy infestations of crabgrasses and goosegrass. MSMA application(s) may temporarily discolor bermudagrass.

Post-emergence Crabgrasses/Goosegrass Control Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Post-emergence Crabgrass/ Goosegrass Control						H_{po}CG[14]	H_{po}CG					

[14] *H_{po}CG indicates that, if necessary, a herbicide may be applied for post-emergence control of crabgrasses and goosegrass during the month.*

Controlling Annual Bluegrass

Pre-emergence

Many herbicides labeled for the pre-emergence control of crabgrasses and goosegrass effectively control annual bluegrass. For best results, apply the herbicide in late summer, before seeds of this troublesome winter annual weed grass germinate, and water (inch) within one week following the herbicide application. Pre-emergence herbicide applications are not generally recommended for the control of annual bluegrass if bermudagrass will be overseeded with perennial ryegrass.[e]

Pre-emergence Annual Bluegrass Control Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Pre-emergence Annual Bluegrass Control								H_{pr}AB[15]	H_{pr}AB			

[15] *H_{pr}AB indicates that, if necessary, a herbicide may be applied in August or September for pre-emergence control of annual bluegrass. A pre-emergence herbicide application is not generally recommended for the control of annual bluegrass if bermudagrass will be overseeded with perennial ryegrass.*

[e] *Perennial ryegrass can be overseeded six weeks after the application of Balan® 2.5G.*

Post-emergence

Pronamide (Kerb) provides post-emergence and pre-emergence control of annual bluegrass when applied in the fall or early winter (e.g., November 15 to December 15) before the soil freezes. The product may also be used in the spring to remove overseeded perennial ryegrass and should not be applied to bermudagrass intended to be overseeded. For information regarding additional products for post-emergence control of annual bluegrass and certain other winter annual broadleaf weeds, please refer to the section Controlling Winter Annual and Perennial Broadleaf Weeds and Weed Grasses in Dormant Bermudagrass.

Controlling Annual Sedge, Purple Nutsedge and Yellow Nutsedge

Annual sedge (*Cyperus compressus*) produces seeds in clusters of flat, green spikes with a few long leaves suspended on bare stems. The seedhead of yellow nutsedge (*Cyperus esculentus)*, a creeping perennial, is yellowish-brown or straw-colored. The leaf tip is needle-like. Round, energy-storage organs (tubers) located at the end of below-ground stems (rhizomes) are capable of producing leaves and roots. Stems of yellow and purple (*Cyperus rotundus*) nutsedge are triangular. The seedhead of purple nutsedge is purple to reddish-brown. The leaf tip of purple nutsedge is blunt. Purple nutsedge plants may produce a network of below-ground chains of rhizomes and tubers.

Pre-emergence

The herbicide metolachlor (Pennant) is labeled for the pre-emergence control of annual sedge in bermudagrass. Metolachlor also provides pre-emergence control of yellow nutsedge. Delay overseeding until four or more months following the application of metolachlor. Do not overseed four months before or six months after applying metolachlor. Oxadiazon (Ronstar), pendimethalin (Pendulum), prodiamine (Barricade) and other herbicides that control crabgrass and goosegrass also control annual sedge pre-emergence; however, they will not control yellow nutsedge in this manner.

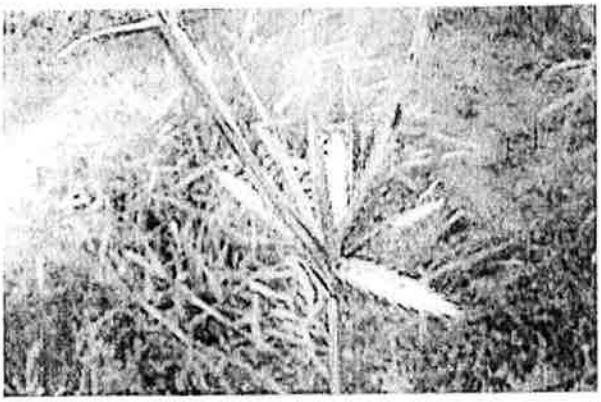

Figure 19. Annual Sedge.

Figure 21. Yellow Nutsedge.

Figure 20. Purple Nutsedge.

Post-emergence

Bentazon (Basagran) is labeled for the post-emergence control of annual sedge and yellow nutsedge in established bermudagrass. Calcium methanearsonate (CMA), disodium methanearsonate (DSMA), halosulfuron (Manage), imazaquin (Image) and monosodium methanearsonate (MSMA) are labeled for post-emergence suppression or control of annual sedge, purple nutsedge and yellow nutsedge in bermudagrass turf (Table 10). Repeat applications (e.g., 10 to 14 days for bentazon and MSMA, three to four weeks for halosulfuron) are most often required for best results. Trifloxysulfuron (Monument) and sulfosulfuron (Certainty) are also labeled for post-emergence sedge control. These herbicides provide the broadest control of sedge species compared to MSMA and other traditional herbicides.

Table 10. Relative Post-Emergence Sedge Control and Tolerance of Bermudagrass and Perennial Ryegrass to Several Herbicides

Herbicide(s): Common Name (Trade Name)	Control			Bermudagrass Tolerance[a]	Perennial Ryegrass Tolerance[a]
	Annual Sedge	Purple Nutsedge	Yellow Nutsedge		
Bentazon (Basagran®)	Good	Poor	Fair to Good	Safe	Safe
CMA/DSMA/MSMA (Several Brands)	Good	Poor to Fair	Fair	Intermediate Safety to Safe	Not Registered
Halosulfuron (Sedgehammer®)	Good	Fair to Good	Good to Excellent	Safe	Safe
Imazaquin (Image®)	Good	Fair to Good	Good	Intermediate Safety to Safe	Not Registered
Imazaquin (Image®) + DSMA/MSMA (Several Brands)	Good to Excellent	Good	Good to Excellent	Intermediate Safety	Not Registered
Trifloxysulfuron (Monument ®)	Excellent	Good to Excellent	Excellent	Safe	Not Registered
Sulfosulfuron (Certainty®)	Excellent	Good	Excellent	Safe	Not Registered

[a] *Safe = safe at labeled rates on healthy and mature turf. Intermediate Safety = may cause minor damage to healthy and mature turf. Not intended to be applied to turfgrasses exposed to stress. Consider applying reduced rates. Not Registered = not registered for use and/or damages this turfgrass species.*

Controlling Summer Annual and Perennial Broadleaf Weeds

Post-emergence

Post-emergence herbicides such as 2,4-D amine, mecoprop (MCPP), dicamba, fluroxypyr, triclopyr and clopyralid are usually applied as a foliar spray within 30 days following the emergence of susceptible broadleaf weeds. For example, 2,4-D amine at a rate of 1 to 2 quarts formulation (3.8 lbs. active ingredient per gallon formulation) per acre applied in June or July often controls emerged summer annual (e.g., prostrate knotweed and spurge) and perennial (e.g., dandelion and white clover) broadleaf weeds. For improved post-emergence control of crabgrasses, goosegrass and foxtails, MSMA can be tank mixed with 2,4-D amine.[f] The addition of a surface active agent (surfactant) to the spray solution may improve herbicide effectiveness. Do not apply 2,4-D amine, MCPP or dicamba during spring green-up.

[f] *Several formulations containing 2,4-D amine (e.g., 2,4-D amine + MCPP, 2,4-D amine + dicamba, 2,4-D amine + MCPP + dicamba, ...) are also labeled for the control of emerged broadleaf weeds in bermudagrass and may be compatible with MSMA.*

Controlling Winter Annual and Perennial Broadleaf Weeds

Post-emergence

The herbicide 2,4-D amine (2 qts. of the 3.8 pounds active ingredient per gallon formulation per acre) may also be applied in November or December to control emerged broadleaf weeds such as clover, dandelions, plantains, wild garlic and wild onion. A second (e.g., mid-January to mid-February) application may be necessary for best control of wild garlic and other broadleaf weeds. Please refer to product labels for more precise information and mixing instructions.

Post-emergence Broadleaf Weed Control Calendars

Month	J	F	M	A	M	J	J	A	S	O	N	D
Post-emergence Summer Broadleaf Weed Control						$H_{po}SB$[16]	$H_{po}SB$					

[16] *$H_{po}SB$ indicates that a herbicide or herbicide combination may be applied, as needed, for the post-emergence control of many summer annual and perennial broadleaf weeds this month.*

Month	J	F	M	A	M	J	J	A	S	O	N	D
Post-emergence Winter Broadleaf Weed Control	$H_{po}WB$[17]	$H_{po}WB$									$H_{po}WB$	$H_{po}WB$

[17] *$H_{po}WB$ indicates that a herbicide or herbicide combination may be applied, as needed, for post-emergence control of many winter annual and perennial broadleaf weeds this month.*

Controlling Winter Annual and Perennial Broadleaf Weeds and Weed Grasses in Dormant Bermudagrass

Pre-emergence and Early Post-emergence in Dormant Bermudagrass

Like pronamide (Kerb), simazine (e.g., Princep) will control annual bluegrass in dormant bermudagrass. Since simazine enters weeds mainly through their roots, moisture is necessary to move the herbicide through thatch and into the root zone of the target weed(s). Simazine will also control several winter annual and perennial broadleaf weeds. Annual bluegrass resistance to triazine herbicides, such as simazine, has been reported in Tennessee and other Southeastern states. Failure to control annual bluegrass with simazine could indicate a resistant population.

Pre-emergence and Early Post-emergence Winter Weed Control in Dormant Bermudagrass Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Early Post-emergence and Pre-emergence Winter Weed Control											$H_{prepo}WW$[18]	$H_{prepo}WW$

[18] *$H_{prepo}WW$ indicates that, if necessary, either pronamide (Kerb®) or simazine (e.g. Princep® and Regal Wynstar®) can be applied to dormant bermudagrass this month (either in November or December), for pre-emergence and early post-emergence control of annual bluegrass and certain winter annual and perennial broadleaf weeds.* **CAUTION: Simazine or pronamide should not be applied to bermudagrass overseeded with perennial ryegrass for fall and spring color.**

Post-emergence in Dormant Bermudagrass

Several herbicides, including diquat (Reward), glyphosate (Roundup Pro) and metribuzin (Sencor for application by commercial turfgrass applicators), are labeled for the post-emergence control of certain broadleaf weeds and weed grasses in dormant bermudagrass. These herbicides are applied in liquid to actively growing weeds before bermudagrasses green-up. Bermudagrass must be dormant. Adding a non-ionic surfactant to a herbicide solution containing diquat or glyphosate may improve herbicide performance. Please read and follow label directions very carefully. Diquat, glyphosate and metribuzin will severely damage or kill ryegrass; therefore, these herbicides should not be applied to dormant bermudagrass overseeded with perennial ryegrass. The addition of metsulfuron, trifloxysulfuron or traditional broadleaf herbicides can potentially aid in controlling difficult-to-control winter weeds such as wild garlic and white clover.

Post-emergence Winter Weed Control in Dormant Bermudagrass Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Post-emergence Winter Weed Control in Dormant Bermudagrass	$H_{pod}WW$[19]	$H_{pod}WW$										

[19] *$H_{pod}WW$ indicates that diquat (Reward®), glyphosate (Roundup® Pro) or metribuzin (Sencor® – by commercial turfgrass applicators) can be applied to dormant bermudagrass this month for post-emergence control of annual bluegrass and certain winter annual and perennial broadleaf weeds.*
CAUTION: Diquat, glyphosate or metribuzin should not be applied to bermudagrass overseeded with perennial ryegrass for fall and spring color. Bermudagrass must be dormant.

For more precise information regarding herbicides and application rates, please refer to Extension **PB1539, Weed Management Recommendations for Professional Turfgrass Managers: Athletic Fields, Golf Courses, Commercial Lawns and Turfgrass-sod**.

Diseases

Bermudagrasses are susceptible to several diseases. A combination of three factors is required for a disease to develop. These are: a susceptible host (bermudagrass), a pathogen and a favorable environment. For example, several pathogens require free water on bermudagrass leaves and optimum temperatures to cause disease. For specific disease control recommendations, please refer to Extension **PB842, Turfgrass Diseases and Their Control**.

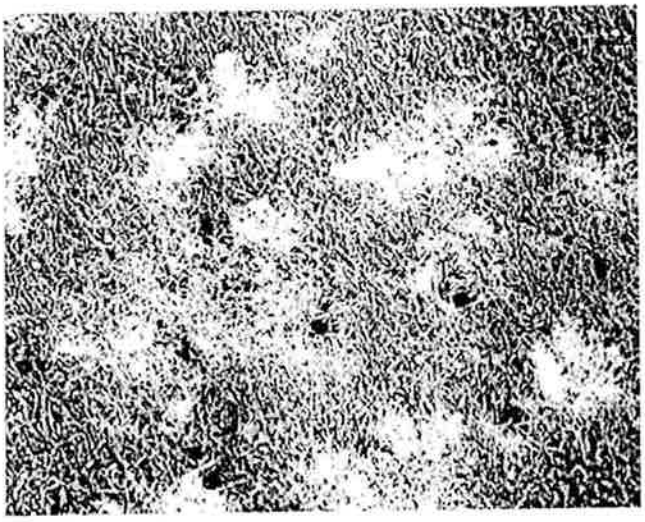

Figure 22. Dollar Spot.

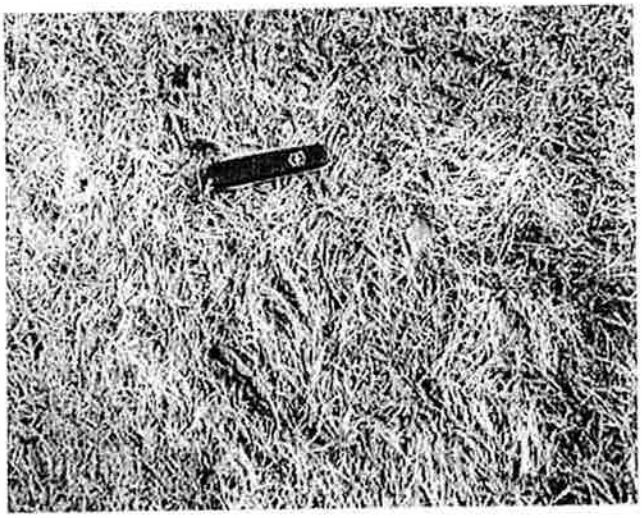

Figure 23. Spring Dead Spot.

Table 11. Symptoms of Several Common Diseases of Bermudagrass

Disease	Symptoms
Brown Patch	Brown patches up to 12 feet in diameter develop during spring green-up.
Dollar Spot	Small, round spots approximately 1 to 3 inches in diameter develop on closely mowed turf. Larger patches of bleached grass develop in bermudagrass maintained at a higher cutting height. Light tan lesions with a distinct dark margin at each edge may appear on infected bermudagrass leaves. Short, fuzzy white mycelium may be visible on lesions when dew is present.
Fairy Rings	Symptoms vary from small to large circles of dark green bermudagrass, dead bermudagrass, mushrooms or puffballs or as combinations of these symptoms. Soils in the rings are often difficult to wet during the summer and fall.
Helminthosporium Diseases	These fungi can affect bermudagrass leaves, crowns or roots. Helminthosporium leaf spot diseases are characterized by small, brown circular lesions that may eventually enlarge and girdle leaves, causing plants to appear light brown or tan. When these diseases attack bermudagrass roots and crowns, the turf may appear to fade out and become thin. These fungi may also affect bermudagrass developing from seed.
Spring Dead Spot	Dead spots may appear in mature (e.g., 3 to 5 years old) bermudagrass as growth resumes after the winter dormancy period. Each spring, for the next three to four years, the spots appear in the same location and expand. After the second or third year of disease activity, rings of dead grass may appear. Bermudagrass may slowly cover these rings of dead grass during summer. The disease may disappear after three to four years.

Table 12. Common Diseases of Bermudagrass and Factors Favoring Their Development

Disease	Factors Favoring Disease Development
Brown Patch	Warm, wet weather; high N fertility level; common on bermudagrass during spring green-up
Dollar Spot	Wet weather; heavy dew; low N fertility level; warm days and cool nights
Fairy Rings	Mushrooms often appear in wet weather
Helminthosporium Leaf Spot	Wet weather and a high level of N fertility
Spring Dead Spot	Cold weather, excessive thatch and high N fertility

Bermudagrass Disease Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Brown Patch				X[20]	X	X	X	X	X			
Dollar Spot					X	X	X	X	X			
Fairy Rings	X	X	X	X	X	X	X	X	X	X	X	X
Helminthosporium Leaf Spot					X	X	X	X	X	X		
Spring Dead Spot			X	X								

[20] *X indicates that the disease may occur during the month. Depending on the disease severity, application(s) of an appropriate fungicide may be required. Spring dead spot may be controlled by applying an appropriate fungicide in the fall before climatic conditions favor disease development.*

Insects

Very few of the many insects living in the turf injure bermudagrass. Insects that do cause damage are classified as root-feeding, shoot-feeding or burrowing. Grubs, billbugs and mole crickets feed on bermudagrass roots. Sod webworms, armyworms, cutworms and chinch bugs feed on aerial shoots. Ants, burrowing bees and wasps often nest in the turf. For information regarding insect control in bermudagrass, please refer to Extension **PB1342, Commercial Turfgrass Insect Control**.

Table 13. Common Insect Pests of Bermudagrass

Pest(s)	Comments
Ants	Usually present, ants are generally not pests. When populations are large, ants can excavate soil, covering bermudagrass plants. Mounds disrupt the uniformity of the soil surface and bermudagrass plants usually wilt.
Armyworms and Cutworms[21]	Occasional pests, armyworm caterpillars measure approximately 1½ inches long at maturity; cutworms, 1½ to 2 inches in length. Armyworms have distinct stripes along the sides of their bodies. Cutworms are larvae of night-flying moths. Several generations of armyworms and cutworms may occur in one growing season.
Bees and Wasps	Some species of bees and wasps burrow into bermudagrass to form their nests. They are usually present and are generally not considered major pests.
Billbugs	Billbugs are considered occasional pests. Overwintering adults usually lay eggs in bermudagrass stems. Larvae feed within stems and hollow them out. They eventually migrate to the roots to feed.
White Grubs[22]	Larvae of several Scarab beetles are frequent pests of bermudagrass in Tennessee. These include green June beetle, Japanese beetle, black turfgrass ataenius and chafers. When large white grub populations exist, severely damaged turf can often be rolled back like a carpet.
Mole Crickets	These occasional pests feed on bermudagrass roots. Plants may be uprooted as mole crickets burrow through the soil.
Sod Webworms[21]	Sod webworm larvae live in thatch during the day and feed on bermudagrass leaves at night. Mature larvae are about 3/4 inch in length, tan and spotted.

[21] *To check for cutworms and sod webworms, prepare a soap solution by adding 2 teaspoons of liquid dishwashing detergent to a gallon of water. Pour this solution over 4 square feet of turf. Treat with an appropriate insecticide when one or more cutworms or four or more sod webworms are found per 4 square feet.*

[22] *Several insecticides effectively control white grubs. Treat bermudagrass when the population reaches the economic "aesthetic" threshold for the problem grub species. Sample several 1 square-foot sections of turf to determine the white grub population. Use a shovel or spade to cut out and lift each section of turf 1 to 2 inches deep and count the number of grubs present. Treat in early to mid-August when the economic threshold has been reached.*

Table 14. Threshold Targets for White Grubs[23]

Pest	Number of Grubs per Square Foot
Annual White Grubs (Japanese Beetle, Oriental Beetle, European Chafer and Asiatic Garden Beetle)	5 to 10
Masked Chafer (Annual White Grub)	15 to 20
Black Turfgrass Ataenius	30 to 60
May/June Beetles	3 to 8
Green June Beetle	6 to 8

[23] Assuming adequate growing conditions and no digging animals.

Bermudagrass Insect Calendar

Month	J	F	M	A	M	J	J	A	S	O	N	D
Ant(s)	X[24]	X	X	X	X	X	X	X	X	X		
Armyworms, Cutworms				X	X	X	X	X	X			
Bees and Wasps						X	X	X	X	X		
Billbugs					X	X	X					
White Grubs		X	X	X			X	X	X			
Green June Beetle Grubs			X	X			X	X	X			
Mole Crickets			X	X								
Sod Webworm						X	X	X	X	X		

[24] X indicates that the insect may be present this month. An insecticide application may be required when damage is apparent.

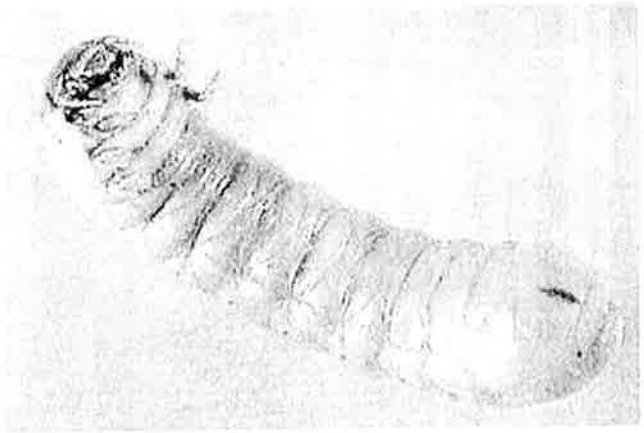

Figure 24. Green June Beetle Larvae.

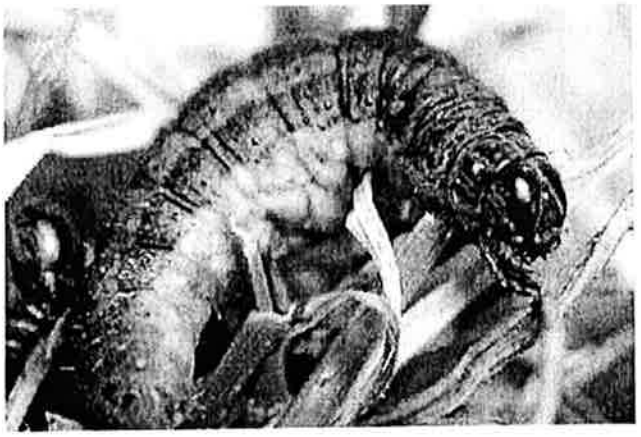

Figure 25. Fall Armyworm Larvae.

Bermudagrass Athletic Field Management Calendar

Maintenance Practice by Month

Month / Management Practice	J	F	M	A	M	J	J	A	S	O	N	D
Mowing				m[1]	M[1]	M	M	M	m	m		
Irrigation				I[2]	I	I	I	I	I	I		
Fertilization		Fh_1[3]	Fh_1	Fh_2[4]	Fh_2	F[5]	F	F	F			
Coring					C[6]	C	C	C				
Topdressing					T[7]	T	T	T				
Dethatching			D[8]			D	D					
Broadcast Straw for Winter Protection											St[9]	St
Remove Straw			St_r[10]									
Overseeding Established Bermudagrass with Perennial Ryegrass									PR[11]			

[1] *m indicates that although mowing may be required this month, the rate of growth of bermudagrass may be slowed by low temperatures. M implies that warm temperatures may promote rapid vertical and lateral growth of bermudagrass.*

[2] *I indicates that water lost to evaporation and transpiration during the month most often exceeds the average total monthly rainfall received in many areas of Tennessee. Bermudagrass most often benefits from supplemental irrigation this month.*

[3] *Fh_1 indicates that a fertilizer + pre-emergence herbicide combination is recommended from late February to mid-March to control summer annual weed grasses including crabgrasses and goosegrass while fertilizing bermudagrass. For example, oxadiazon (Ronstar®) will control crabgrasses and goosegrass before seedlings emerge from the soil and will not harm newly sprigged bermudagrass.*

[4] *Fh_2 indicates that fertilization will promote the growth of bermudagrass this month and, depending on the pre-emergence herbicide applied with the starter fertilizer in late February or March, a pre-emergence herbicide applied with fertilizer in late April or May could extend the crabgrass and goosegrass control period.*

[5] *F indicates that fertilization will promote the growth of bermudagrass this month.*

[6] *C indicates that bermudagrass may benefit from coring during the month.*

[7] *T indicates that bermudagrass may be topdressed as needed during the month.*

[8] *D indicates that, if necessary, bermudagrass may be dethatched during the month. Thatch removal in March, while bermudagrass is dormant, may help speed spring green-up. Actively growing plants often recover quickly following dethatching in June or July. Dethatching is not generally recommended in August if a temporary reduction in turfgrass shear strength is unacceptable and the athletic field will receive heavy use in late summer and early fall.*

[9] *St = Broadcast straw in late November or early December to protect dormant bermudagrass from low-temperature extremes during winter.*

[10] *St_r = Remove straw when the threat of extended periods of freezing temperatures is low (for example, from early to mid-March).*

[11] *PR indicates that bermudagrass can be overseeded with perennial ryegrass this month to provide color during the winter dormancy period.*

Crabgrass Control by Month

Month	J	F	M	A	M	J	J	A	S	O	N	D
Pre-emergence		H_{pr1} CG[12]	H_{pr1} CG	H_{pr2} CG[13]	H_{pr2} CG							
Post-emergence						H_{po}CG[14]	H_{po}CG					

[12] *H_{pr1}CG indicates that, if necessary, a herbicide or granular fertilizer + herbicide combination may be applied from late February to mid-March for pre-emergence control of crabgrass and goosegrass. For example, a pre-emergence herbicide + starter fertilizer (containing P, K and very little N) combination will control crabgrass and goosegrass as weed seeds germinate while supplying bermudagrass with the essential primary nutrients.*

[13] *Depending on the pre-emergence herbicide or herbicide + starter fertilizer combination applied in late February or March, a second pre-emergence herbicide application from late April to mid-May could extend the crabgrass and goosegrass control period. The pre-emergence herbicide could be applied in combination with fertilizer.*

[14] *H_{po}CG indicates that, if necessary, a herbicide may be applied for post-emergence control of crabgrass and goosegrass during the month.*

Annual Bluegrass Control by Month

Month	J	F	M	A	M	J	J	A	S	O	N	D
Pre-emergence								H_{pr}AB[1]	H_{pr}AB			

[15] *H_{pr}AB indicates that, if necessary, a herbicide may be applied in August or September for pre-emergence control of annual bluegrass. Several herbicides labeled for pre-emergence control of crabgrasses and goosegrass also control annual bluegrass when applied just before seeds of this winter annual weed grass germinate. A pre-emergence herbicide application is not generally recommended for the control of annual bluegrass if bermudagrass will be overseeded with perennial ryegrass.*

Summer Broadleaf Weed Control by Month

Month	J	F	M	A	M	J	J	A	S	O	N	D
Post-emergence						H_{po}SB[16]	H_{po}SB					

[16] *H_{po}SB indicates that a herbicide or herbicide combination may be applied, as needed, for the post-emergence control of many summer annual and perennial broadleaf weeds this month.*

Winter Broadleaf Weed Control by Month

Month	J	F	M	A	M	J	J	A	S	O	N	D
Post-emergence	H_{po}WB[17]	H_{po}WB									H_{po}WB	H_{po}WB

[17] *H_{po}WB indicates that a herbicide or herbicide combination may be applied, as needed, for post-emergence control of many winter annual and perennial broadleaf weeds this month.*

Winter Weed Control in Dormant Bermudagrass by Month

Month	J	F	M	A	M	J	J	A	S	O	N	D
Pre-emergence and Early Post-emergence in Dormant Bermudagrass											H_{prepo}WW[18]	H_{prepo}WW

[18] *H_{prepo}WW indicates that, if necessary, either pronamide (Kerb®) or simazine (Princep® and Regal Wynstar®) can be applied to <u>dormant</u> bermudagrass this month (either in November or December), for pre-emergence and early post-emergence control of annual bluegrass and certain winter annual and perennial broadleaf weeds.* **CAUTION: Simazine or pronamide should <u>not</u> be applied to bermudagrass overseeded with perennial ryegrass for fall and spring color.**

Month	J	F	M	A	M	J	J	A	S	O	N	D
Post-emergence in Dormant Bermudagrass	$H_{pod}WW$[19]	$H_{pod}WW$										

[19] *$H_{pod}WW$ indicates that diquat (Reward®), glyphosate (Roundup® Pro) or metribuzin (Sencor® – by commercial applicators) can be applied to dormant bermudagrass this month for post-emergence control of annual bluegrass and certain winter annual and perennial broadleaf weeds.* **CAUTION: Diquat, glyphosate or metribuzin should not be applied to bermudagrass overseeded with perennial ryegrass for fall and spring color. Bermudagrass must be dormant.**

Recommendations of specific herbicides are included in this publication as a convenience to the reader. The use of brand names and any mention or listing does not imply endorsement by the University of Tennessee nor discrimination against similar products not mentioned. Individuals using herbicides are responsible for ensuring that the intended use complies with current regulations and the product label. Always read the label before selecting, purchasing, mixing and applying a herbicide and follow label directions very carefully.

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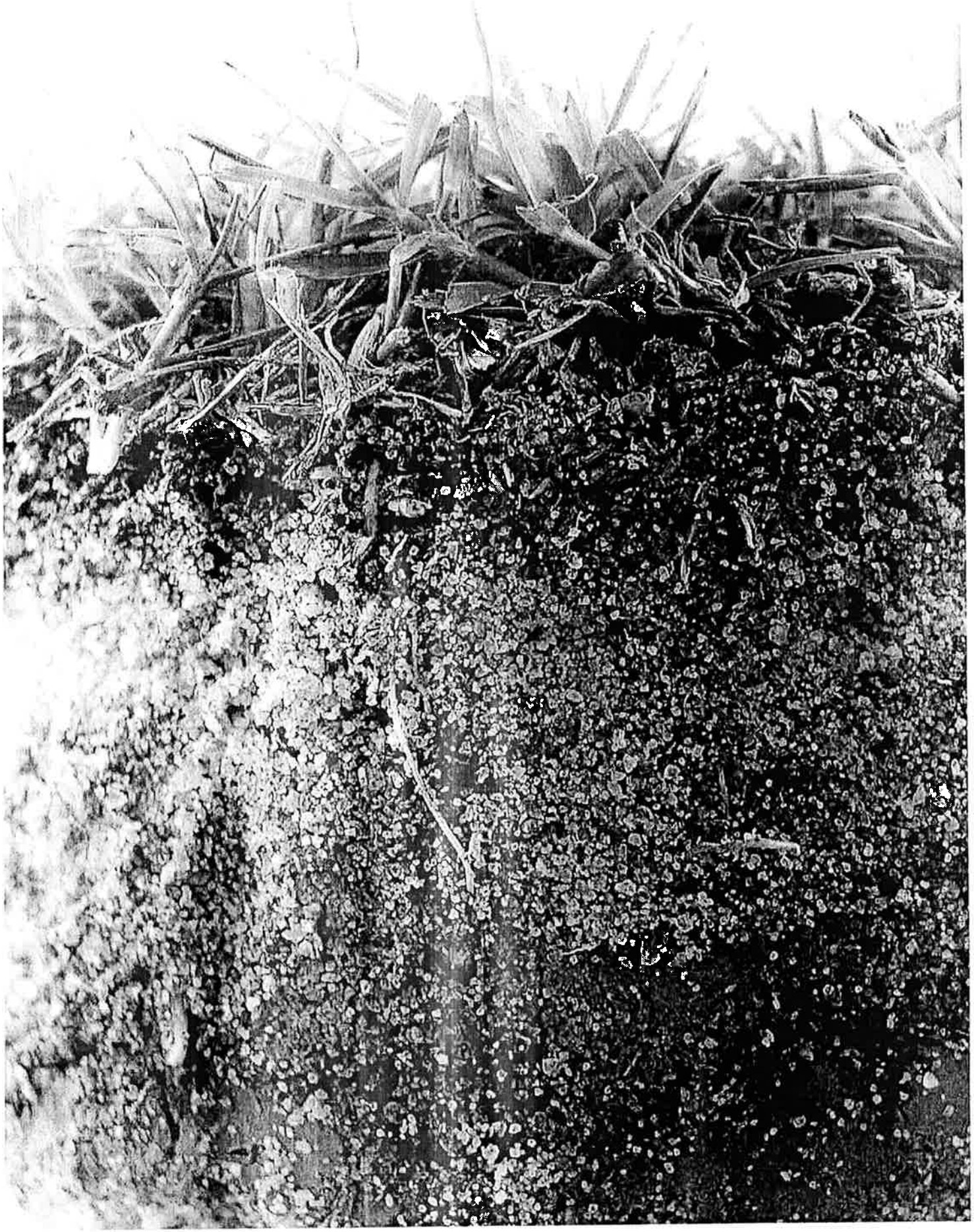

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MANAGEMENT AGREEMENT

THIS MANAGEMENT AGREEMENT ("Agreement") is entered into as of the 1st day of October, 2012, by and between the Chicago White Sox, Ltd. ("Chicago") and Bristol Baseball, Inc. ("Bristol").

W I T N E S S E T H:

WHEREAS, Chicago currently controls the right to operate the baseball team known as the Bristol Sox or the Bristol White Sox (the "Team"), a rookie league minor league team in the Appalachian League; and

WHEREAS, Chicago desires to engage Bristol Baseball, Inc. to manage the business operations of the Team for the 2013 to 2014 baseball seasons, at Boyce Cox Field in Bristol, Virginia.

NOW, THEREFORE, for and in consideration of the monies described herein and the mutual terms and conditions here and after contained, and other good and valuable consideration, the receipt and sufficiency, all of which are hereby acknowledged, the parties agree as follows:

1. Engagement. Chicago hereby enters into this Agreement with Bristol upon the terms and conditions hereafter stated.

2. Term. The term of this Agreement shall be from October 1, 2012 through September 30, 2014 (the "Term").

3. Duties. Bristol shall devote its efforts and attention to the management of the Team during the Term. In addition, Bristol shall have, and be required to fulfill, the following specific duties:

    a. Unless otherwise described herein, Bristol shall pay and be solely responsible for any and all costs and expenses, including all yearly operational debts, obligations, dues and assessments owed to the Appalachian League, MLB ("MLB") and Minor League Baseball ("MiLB") (i.e., ticket taxes and marketing revenues), incurred in or arising from the operation of the Team during the Term. Any and all debts, obligations and assessments not considered to be an ordinary annual operating expense shall remain the obligation of Chicago.

    b. Bristol shall operate and maintain the business in the usual course and will specifically refrain from (i) disposing of any assets which belong to Chicago, (ii) creating any liens upon the assets of Chicago, or (iii) entering into any contracts with respect to the Team or its operations that have a duration extending beyond the Term.

c. Bristol will use its best efforts to preserve the business intact and to keep available to Chicago the franchise in good standing in the Appalachian League.

d. All home games must be played at Boyce Cox Field. Bristol shall be responsible for having Boyce Cox Field, including but not limited to, the field lights, dressing areas, clubhouse, and playing field, comply with all Professional Baseball Agreement ("PBA") standards and requirements of MiLB and the Appalachian League, unless an exemption is granted to Bristol by MiLB and/or the Appalachian Leauge. Bristol shall pay and be responsible for any and all improvements, modifications and additions to Boyce Cox Field to make it comply with such standards. If an exemption to such standards is granted to Bristol, reasonable documentation regarding such exemptions must be given to Chicago by Bristol. It is specifically understood that the field lights and visiting clubhouse at Boyce Cox Field shall comply with all PBA standards for existing facilities.

e. Chicago shall appoint the director ("Director") to represent the Team on the Appalachian League's Board of Directors. Chicago agrees to cause Director to consult with Bristol as to all issues that would affect Bristol's operation of the Team, and to provide Bristol with copies of all Appalachian League meeting minutes, rules, regulations and any correspondence relating to the Team's operation. If the Director appointed by Chicago is unable or unwilling to attend any meeting of the Appalachian League's Board of Directors during the term of this Agreement, Chicago shall grant Bristol the proxy at such meeting(s).

f. Bristol shall ensure that a certified sports turf manager or other experienced groundskeeper well versed in the care and maintenance of a professional baseball field commensurate with standards set forth by MiLB and the PBA is responsible for the care of Boyce Cox Field. Such person shall be subject to the approval of Chicago, which approval shall not be unreasonably withheld. Such groundskeeper shall work with the City of Bristol ("City") to maintain the field in accordance with the above standards. Bristol agrees that it is its responsibility, regardless of its agreement with the City, for maintenance of the field commensurate with such standards. If required by Chicago, Bristol will retain the services of the Brickman Group for advice on care and maintenance of the Boyce Cox Field.

g. Bristol shall retain, at its sole cost and expense and subject to the approval of Chicago, which approval shall not be unreasonably withheld, an experienced clubhouse manager to maintain the home clubhouse in an organized and clean manner, monitor and maintain baseball equipment, launder baseball uniforms and practice clothing, provide food after consultation with Chicago's manager, trainer or strength and conditioning coach, implement menu plans resulting from such consultation[s], and to engage in such other activities normally associated with a clubhouse manager. Chicago will make commercially reasonable efforts to provide the services of its Arizona clubhouse staff for a couple of days to train the Bristol clubhouse staff; provided, however Bristol acknowledges that such

obligation is subject to the availability of the Arizona staff and Chicago's sole and absolute discretion as to what would be considered commercially reasonable.

h. Bristol shall, at its sole cost and expense, (i) upgrade its existing batting cages to prevent excessive bounce from hard surfaces within the cage by padding the poles and other hard elements within the cage and (ii) maintain the cage to standards commensurate with a MiLB facility.

i. Bristol shall, at its sole cost and expense, obtain new larger on field batting screens (subject to Chicago's approval) for pre-game use in form and substance acceptable to MiLB and PBA standards and shall use such screens during every pre-game batting practice and during such other pre-game or practice drills as reasonable to protect the safety of the players, coaches and participants in such activities.

j. Bristol shall, at its sole cost and expense, install rubber, or such other flooring as reasonably acceptable to Chicago, in all the high traffic areas of the home team's clubhouse so as to improve footing within the clubhouse area.

4. Compensation. Except as otherwise noted herein, in consideration of this Management Agreement, Bristol shall be entitled to retain all "Income and Profits", if any, as herein defined during the Term. "Income and Profits" shall be defined to mean all cash and accounts receivable received less all expenses of the Team for which Bristol is responsible, received or incurred during the Term or related to the 2013 and 2014 Baseball Seasons.

5. Indemnity.

a. Bristol undertakes and agrees to indemnify and hold harmless Chicago from, against, and in any respect of, any and all loss, damage, costs or expenses, including reasonable attorney's fees from any acts or omissions taken by Bristol pursuant to this Agreement, or otherwise relating to the operation of the Team during the Term regardless of the acts or omissions of Bristol. This includes indemnification with respect to the security issues surrounding attendance at and operation of a Minor League ballpark.

b. Chicago undertakes and agrees to indemnify and hold harmless Bristol from, against, and in any respect of, any and all loss, damage, costs or expenses, including reasonable attorney's fees from Chicago's acts or omissions performed or commitetted during the Term. .

6. Relationship of the Parties. It is the expressed intention of the parties hereto that Bristol is and shall be deemed an independent contractor under this Agreement and no partnership shall exist between Chicago and Bristol. Bristol shall have full discretion in determining the method of performing its duties and obligations under this Agreement

and shall be fully responsible for the payment of all of its income taxes, Social Security taxes, unemployment compensation taxes, workers' compensation insurance premiums and other taxes, if any, payable with respect to itself and its employees. This Agreement does not constitute Bristol as the agent, legal representative, or employee of Chicago for any purpose whatsoever, except as a proxy holder under Paragraph 3(e). Bristol has absolutely no ownership interest in the Team and shall have no voting power within the Appalachian League or MiLB representing the Team's interest, except as otherwise noted herein.

7. Intellectual Property. Bristol acknowledges and agrees that the Chicago owns all rights in and to operation of the Team and that all intellectual property rights in and to the Team name, logo, domain name, and all other intellectual property rights associated with the Team ("Team IP Rights") shall be the property of Chicago. However, Team IP rights shall not include rights regarding content, other than items specifically mentioned above, which is not owned, generated or maintained by Chicago. Further, Bristol agrees to take such action as reasonably requested by Chicago to transfer or protect such Team IP Rights.

8. Ballpark Lease Payments & Annual Sponsorship Fees. Bristol has entered into a lease agreement (the "Lease") with the City of Bristol ("Landlord") for Boyce Cox Field dated February 23, 2012 whereby Bristol has the right to use of the field for the 2012 Baseball Season and an option to extend the Lease for the 2013 and 2014 Baseball Seasons. Bristol will exercise its option to extend the Lease for all seasons during the Term. In the event Landlord elects not to extend the Lease for any season during the Term, Chicago may immediately terminate this Agreement. A copy of the lease agreement, or amendment thereof, will be given to Chicago by Bristol for each year this Agreement is in effect.

    a. Any portion of annual sponsorship monies paid by or on behalf of the Chicago White Sox entities to the Team ("Annual Sponsorship") in consideration for Team advertising shall be retained by Bristol.

    b. Any portion of the Annual Sponsorship compensated by the Guaranty Payment relating to the Team shall be retained by Bristol with Chicago having no interest therein and not be obligated to Bristol for any Team advertising related thereto.

9. Other Provisions.

    a. All rights and interests in the Bristol White Sox shall remain the sole and absolute property of Chicago.

    b. If MiLB, the Appalachian League, or Chicago White Sox notifies Bristol of any major problems within the control of Bristol or which Bristol has the ability to solve that are not otherwise covered by this Agreement, Bristol shall take reasonable steps to solve the problems in a timely manner.

10. Liability Insurance. Chicago White Sox and the Appalachian League shall be named as an additional insured on Bristol's liability insurance policies relating to the Team. Bristol shall maintain the following insurance: General Liability ($1,000,000 limits) and Worker Compensation (in statutory limits) and Bristol shall provide Chicago certificates of insurance evidencing such coverage and additional insured status. Bristol and the Appalachian League shall be named as an additional insured on any insurance policies of the Chicago White Sox relating to the Team and Chicago shall provide Bristol with certificates of insurance evidencing such coverage and the additional insureds.

11. Arm's Length Transaction. The parties further agree that the Agreement is to be deemed to have been prepared jointly by the parties hereto, after arm's length negotiations, and that any ambiguity or uncertainty existing herein, if any, shall not be interpreted against either party.

12. Entire Agreement. It is expressly understood that this Agreement sets forth the entire agreement of the parties and supersedes any prior written or oral agreements between them concerning the subject matter contained herein, oral or otherwise, and that there is no other agreement between the parties other than that contained herein.

13. Choice of Laws. The validity and construction of this Agreement shall be determined in all respects in accordance with the laws of the State of Virginia.

14. Counterparts. This Agreement may be signed by the parties in counterparts and all counterparts together shall constitute a fully executed copy.

15. Assignable and Transferable. This Agreement shall be assignable or transferable by Bristol and Chicago upon the prior written consent of the other party, with such consent not being unreasonably withheld; provided, however Chicago may assign this Agreement to another MLB club without consent of Bristol. Further, no assignment by Bristol and Chicago shall be effective without the prior written consent of the Appalachian League and MiLB. Any successor in interest to Chicago and Bristol shall agree to be bound by all of the terms and conditions of this Agreement.

16. Confidentiality. All parties hereto hereby acknowledge the necessity to keep the terms and conditions of this Agreement confidential with the understanding that the Agreement may be disclosed to the owner of Boyce Cox Field if they agree to abide by the confidentiality terms of this Agreement and to not disclose this Agreement outside their organization and its lawyers, accountants and legal representatives.

17. Subservience to Baseball Rules. Notwithstanding any other provision of this Agreement, any and all rights granted by Team to Bristol pursuant to this Agreement are subject and subservient to the terms and conditions of the following:

(A) This Agreement and the rights, protections, and rights granted hereunder shall be subject to the approval of Chicago's League, the President of MiLB, and the review of the Office of the Commissioner of Baseball and shall, in all respects, be subordinate to,

and shall not prevent the issuance, entering into, or amendment of, any of the following, each as may be issued, entered into, or amended from time to time (collectively, the "MiLB Documents"): (1) any present or future agreements or arrangements regarding the telecast, broadcast, recording (audio or visual), or other transmission or retransmission (including, but not limited to, transmission via the Internet or any other medium of interactive communication, now known or hereafter developed) of MiLB games, and/or the accounts and descriptions thereof, entered into with third parties by any of the MiLB Entities, either on its own behalf or on behalf of the MiLB Clubs and/or other MiLB Entities; (2) any other present or future agreements or arrangements entered into with third parties by, or on behalf of, any of the MiLB Entities, including, without limitation, those relating to ticketing, e-commerce, and/or the exploitation of intellectual property rights in any medium, including the Internet or any other medium of interactive communication; (3) any present or future agreements or arrangements entered into by Team (or Chicago on behalf of Team) with the other MiLB Clubs and/or one or more of the MiLB Entities or MLB (including, without limitation, the Professional Baseball Agreement ("PBA"), the National Association Agreement ("NAA"), the Major League Rules ("MLR"), the governing documents for the Team's League, each agency agreement and operating guidelines among the MiLB Clubs and a Minor or Major League Entity); and (4) any Rules issued or adopted either by the Commissioner of Baseball, the President of the National Association of Professional Baseball Leagues, Inc. or its Board of Trustees, the Team's League, or otherwise pursuant to applicable baseball rules. The Team, Chicago and Bristol shall each comply with all applicable terms, conditions and requirements contained in the MiLB Documents with respect to the subject matter of this Agreement.

(B) Notwithstanding anything to the contrary contained in any part of this Agreement, any change of the exclusive management authority of the Team shall be subject to and made in accordance with MiLB or Office of the Commissioner of Baseball, all as the same now exist or may be amended or adopted in the future. Any such change that requires the consent of the President of MiLB is prohibited and shall be null and void unless such prior consent is obtained. Such consent may be withheld at the sole discretion of the President of MiLB. The decision of the President of MiLB shall be made after consulting with, and shall be subject to review by, the Office of the Commissioner of Baseball.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and date first above written.

CHICAGO WHITE SOX, LTD.

By: _____
General Manager

BRISTOL BASEBALL, INC.

By: _____
President